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FINAL REPORT ON E-COMMERCE IN THE SA CLOTHING SECTOR

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EXECUTIVE SUMMARY

This exploratory paper critically discusses the prospects and challenges of e-business for the South African apparel industry. From a development perspective, this exploratory study is important because employment and export growth prospects for the apparel industry hinge increasingly on leveraging information and communication technologies (ICTs) as a means of promoting industrial upgrading within global and local value chains. The paper seeks to address the following key question: Can e-business provide a necessary lever to enhance growth and competitiveness of the South African clothing industry?

The basis of the empirical data and analysis is a series of open-ended, face-to-face interviews with 21 apparel manufacturers; four apparel retail groups and seven individual retail chains, covering 17 separate retail chains in total. In addition seven personal interviews were conducted with industry experts. On the basis of the experts' recommendations we decided to target large manufacturers, especially those who are currently exporting, as well as the major national retail chains. Based on their experience, the experts believed that these large enterprises were more likely to have a fairly sophisticated IT infrastructure. Moreover, the lead firms in the apparel value chain are strategically placed to provide industry-wide insight into the uptake, prospects and challenges of e-business for the South African clothing industry.

The diffusion of e-business in the retail sector appears to be a function of ownership, firm size and market segment. As far as ownership is concerned, it would seem as if JSE listed firms are more likely to have adopted e-business technologies than firms which are a subsidiary of a domestic company, and to a greater extent, private companies. Larger firms (i.e. firms which have more than 1 000 employees) reveal a higher uptake of e-business technologies than smaller firms (i.e. firms with less than a 1 000 employees). Market segment in the retail link also seems to be an indicator of a firm's adoption of e-business technologies. Retail chains operating in the AB and BC market segments were more likely to have ERP, EDI and a website, and to be currently engaged in online trading, than retail chains operating in the CD market segment.

The e-business results of the manufacturers were not affected by ownership or channel of sales (marketing segment). Firm size and export orientation, however, seem to have affected the diffusion of e-business technologies amongst the manufacturers. The larger producers are more likely to have ERP, EDI, a website and an Intranet than the smaller producers. In addition, the larger manufacturers are more likely to be engaged in online B2B trading than the smaller garment-makers. Manufacturers who are currently exporting would seem to have a better uptake of e-business technologies than the non-exporters. However, since we are dealing with relatively small numbers caution is advised when reaching conclusions. The results are nonetheless suggestive.

Two separate issues arise out of the study. Firstly, supply chain management (SCM) appears to be a blind spot for many companies in the apparel industry. Secondly, most companies still do not regard the Internet as a key marketplace

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challenge, i.e. they do not regard e-business as critical to their success. Despite strong theoretical arguments suggesting that e-business has much to offer the apparel industry (in terms of connecting to markets, productivity gains, potential cost savings and systemic efficiencies), the empirical evidence would seem to suggest that e-business in the garments industry is still largely uncharted territory. The impact of Internet-based B2B e-commerce on the apparel industry has been minimal, and firms are in no rush to put in place the necessary Web architecture. Moreover, the retailers are largely passive governors in the apparel value chain and are not exerting any real pressure on their suppliers to adopt e-business systems.

E-business requires trusting supply chain partners with proprietary information. For firms to benefit fully from e-business there needs to be end-to-end free flows of data, which, currently, is not a defining feature of the South African apparel production-retail channel. Secondly, commercial information which most firms regard as being sensitive will need to be released for full benefits to be delivered. For this to happen close, collaborative relationships based on trust, loyalty and reciprocity will need to be cultivated. This will not be an easy task considering the adversarial nature of the relations that traditionally exists between buyers and sellers. It may well be that the Internet itself could be used as a mechanism to build trust between firms. The value lies in the connectivity, especially the ability of manufacturers to begin to engage in a dialogue with the retailers. As co-creators of value, they could, in theory, cultivate trust and relationships in the value chain.

A major challenge for the SA apparel industry is to expand markets geographically; and particularly to direct overseas market expansion. Our fieldwork evidence would seem to confirm that producers are not using the Internet to link into export markets. We believe that SA garment-makers should target the higher value-added, more fashion-oriented segment of the export market which is characterised by shorter production runs, more complex styles and more frequent style changes. This segment is also quite demanding in terms of increased pressure on manufacturers to fill orders quickly, efficiently and flexibly. E-business capabilities will thus become essential for sustained competitiveness in the fashion-oriented segment of the value chain. The challenge for SA apparel manufacturers is to forge international linkages in order to establish a pipeline through which resources, technology, skills, etc. will flow from the lead firms in global-scale production networks. The Internet could play a pivotal role in building pipeline linkages with lead firms in the US and EU in order to leverage favourable trade agreements.

For the South African apparel industry, the benefits of e-business are likely to be more tangible in terms of *information management* rather than in procurement and sales. In other words, the real gains from online B2B e-commerce will come not from trading online but from better access to and the exchange of information such as supply and demand forecasts and reports of inventory levels along the supply chain. At this early stage of e-business development, online digital trading networks are very much a long-term goal. Our findings indicate that sales, purchasing and operations are generally not Web-enabled. Therefore, online transaction-processing benefits will be hard to achieve in the short-term.

We believe that policy initiatives should be targeted in the short-term on promoting ICT-based communication and information exchange between firms, and on supply chain management and logistics. We argue that these are the two critical areas in which gains are likely to be more immediate. Our findings suggest that the lack of high-quality inter-firm information and data exchange produces various forms of supply chain inefficiencies in the industry, such as long lead times and high inventory levels. Therefore, effort and investment should be put in improving information flow in the apparel value chain. The policy challenges of such an intervention revolve around providing security, establishing a standard format for information flows and making sure that firms share information fairly.

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The DTI has a role to play in supporting and actively encouraging clothing manufacturers to adopt the Internet for managing information flows. State supply-side policy support programmes such as the Sector Partnership Fund, Competitiveness Fund and the Innovation Fund could be leveraged in this regard. There is also a role for other stakeholder groups such as SACTWU and Clofed to promote amongst their members an understanding of the strategic value of e-business. There may also be a role for the DTI, SACTWU and Clofed to work together on a project to plan and develop an information portal for the garments industry in South Africa. The information portal should aim to: (1) connect garment-makers and retailers through a common communication infrastructure of interactive tools; and (2) function as a gateway to individual corporate portals, where logistics and transaction management is handled by individual firms. All a company would need to connect to the information portal would be a PC which is linked to the Internet. Therefore even small companies with a rudimentary IT infrastructure will be able to link into the portal. The primary benefits of the industry portal will be its ability to speed up the flow of information and to make it more widely available.

The hypothetical benefits of online B2B trade exchanges rest largely on the potential for seamlessly integrating data flows and work processes across the entire value chain. In the South African apparel industry this kind of deep integration would be very difficult to achieve, primarily because:

1. the supply chains are *complex* (as it involves both core products such as white dress shirts, lingerie, basic T shirts, etc. and specialised fashion items for which demand varies) and *fragmented* (because of trends such as outsourcing, subcontracting and informalisation of the industry); and
2. most companies simply do not have Intranets, enterprise resource planning (ERP) and decision support systems, and are unlikely to make big investments in ICTs in the short-term to integrate their back- and front-office systems.

Real benefits of B2B trading exchanges have tended to be quite elusive. Companies, such as low-end apparel retailers, purchasing commodity products might, however, value the liquidity, transparency and price-orientation of a B2B e-marketplace. This may also apply to producers purchasing commodity items such as buttons and zippers from input suppliers. On the other hand, companies purchasing highly specialised fashion garments value the possibilities for customisation offered by the traditional bilateral relationship between buyer and seller. Therefore, we believe that bilateral relationships will continue to be important in the fashion apparel industry. A hypothesis that emerges quite clearly from this study is: *online B2B e-commerce will be more advanced in highly consolidated commodity product markets.*

To reiterate, very few apparel firms use information technology with any level of sophistication, making it difficult for them to track projects, materials, suppliers and customers in any kind of transparent way. The major benefits of e-business for the garments industry are to be found in the realm of information management, supply chain management (SCM) and logistics rather than in B2B e-marketplaces and online auction sites. By focusing on these two priorities, we believe that the apparel industry could move a step closer towards:

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1. streamlining and optimising the flow of information that is generated in the retail-apparel channel;
2. shrinking the apparel supply chain by integrating a network of suppliers, producers and retailers; and
3. compressing the time it takes from ordering a garment to its delivery for sale in the retail store.

However, given the low base of IT sophistication and the formidable obstacles facing e-business that need to be overcome, this is very much a long-term, and indeed, a continuing project.

1. INTRODUCTION

Economic globalisation is being driven by pervasive information and communication technology (ICT) use, deregulation, the opening of markets and global trade expansion (Cohen et al 2000; Dicken 1998). ICTs now form an integral part of the accelerated pace of globalisation, linking together nation states into complex webs of transnational exchanges (Castells 1996; Gereffi 2000).¹ The Internet is becoming a key enabler of the global, digitally networked economy. Moreover, economic progress is becoming increasingly knowledge-driven, and information and knowledge are becoming primary wealth-creating assets (Castells, 1996; Evans and Wurster 2000; Fine 1998). In such a computer network-driven economic environment, what are the challenges for industrial upgrading and global competitiveness in a low-tech, labour-intensive sector like clothing?

E-business, it is argued, is likely to affect the global clothing industry by fundamentally changing the competitive drivers.

The open structure and interoperable standards of the Internet, and the relatively low cost of using it, offers apparel manufacturers and retailers a new and powerful information and communication system. The Internet provides a common IT platform across the value chain. The Internet thus has great potential as a linkage mechanism in the apparel value chain. E-business could be considered an upgrading initiative since it adds knowledge that could, at least in theory, improve the productivity and competitiveness of the South African apparel industry. The Internet provides apparel manufacturers with new opportunities to deepen and intensify their relations with trading partners. E-business offers the firm a virtual link with its customers and suppliers, the objective of which is to maximise key operational synergies between the trading partners. Flows of information are one critical mechanism through which garment-makers could improve or consolidate their positions in global-scale value chains. Moreover, e-business offers garment-makers increased market access. It provides a platform to establish forward linkages to developed country markets, thus providing apparel companies with an opportunity to take advantage of favourable quotas in the EU and the US.

South Africa is seasonally six months behind European and US fashion, and is largely a passive recipient of global fashion trends. Building and maintaining new sources of competitive advantage are crucial for local garment producers to break out of the low productivity, low value-adding path in which they are currently locked into. Can e-business provide a necessary lever to enhance growth and competitiveness of the South African clothing sector? Time-to-market, for instance, has arisen as a critical competitive asset in the global economy, especially since shorter seasons, more rapid product cycle turnover, and smaller production runs are becoming the norm in the value-added, fashion-oriented segment of the global apparel market. The penetration of the more differentiated, fashion segment of the export market is vital for the development and long-term viability of the SA apparel industry.

The transition to an Internet-connected, ICT-based economy presents both opportunities and challenges for the South African garments industry. This exploratory paper critically discusses the prospects and challenges of e-business for apparel firms. From a development perspective, this exploratory study is important because employment and export growth prospects for the apparel industry hinge increasingly on leveraging ICTs as a means of promoting industrial upgrading within global and local value chains. This paper seeks to address the following key questions: What are the competitive pressures driving change within the South African clothing sector? What is the payback from e-business for

¹ Castells (1996), for instance, writes about a globalised and networked “informational” capitalism.

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the apparel industry? How can clothing manufacturers and retailers “get the right product in the right place at the right price at the right time” (Christensen and Tedlow 2000: 42)? Will the South African apparel industry be able to develop a long-term competitive position in the global marketplace without e-business capabilities?

The paper is organised into seven sections. The first, preliminary section sets out the research agenda, and identifies a number of critical questions that will be interrogated in the paper. The second section situates the study in the South African context, and identifies the key challenges confronting the apparel industry. We use Gereffi’s (1994) global commodity chain (GCC) approach to comprehend the competitive dynamics in the South African apparel industry. This section is important because it highlights the changing terms of trade patterns and the key competitive drivers that are likely to impact on how we view the role of ICTs, and especially e-business, in the garments industry. The third section attempts to present a clear understanding of what e-business actually means. By defining the concept and laying out the parameters of e-business, we hope to be able to better assess its potential for the garments industry.

Section four evaluates the prospects of e-business for garment-makers and retailers. In this section, we examine, at the theoretical level, the payoff of business-to-business (B2B) and, to a limited extent, business-to-consumer (B2C) e-commerce for the industry. We focus on B2B e-commerce because our concern is primarily with the promise of Internet-enabled supply chain management (SCM) and logistics for the apparel industry. This research focus is in accord with work that we have already done in the automotive and wooden furniture industries. We also consider the challenges and risks that e-business poses for apparel companies. Essentially, Sections 3 and 4 comprise the theoretical backbone of the paper, and establish a foundation on which to analyse the empirical findings presented in Section 6. Section 5 sets out the methodology that was employed in this study. The basis of the empirical data and analysis is a series of open-ended, face-to-face interviews with 21 apparel manufacturers; 4 apparel retail groups and 7 retail chains, covering 17 separate retail chains in total. In addition, seven personal interviews with industry experts were conducted. Section 6 presents and analyses the empirical findings that emanated from the study. The section is divided into two subsections: (1) retailers’ experiences and perceptions of B2B e-commerce, and (2) manufacturers’ experiences and perceptions of B2B e-commerce. The final section, Section 7, concludes the study by weaving together the main threads of the paper, both theoretical and empirical.

2. WHITHER THE SOUTH AFRICAN APPAREL INDUSTRY?

For decades, the South African clothing sector was sheltered by state protectionism and a policy favouring import substitution industrialisation (ISI). In the post-apartheid era, however, the relatively uncompetitive apparel industry has become increasingly exposed to the cut and thrust of international competition as a direct result of a major shift in state policy to open markets, a rapid erosion of both tariff and non-tariff barriers and the implementation of an export-oriented industrial policy. The industry's drive for international competitiveness has, however, been problematic. Over the last decade, the clothing industry has experienced low productivity, massive formal-sector job losses, firm closures, and a flood of cheap imported clothing, both legal and illegal, primarily from the Far East. The ready availability of low-cost imports increased competition in the domestic market, induced restructuring of the domestic clothing production industry, and drove down local manufacturers' prices.

The convergence of these factors, resulting mainly from the pressures of globalisation, the intensification of international competition and rapid and sweeping trade liberalisation, have led to a fragmentation of the garment manufacturing industry in South Africa.² It has been estimated that 18 300 formal sector jobs were lost in the clothing sector between 1994 and 1999 (DTI 2000) (see Box 1). This is problematic in a country like South Africa where there is limited alternative employment opportunities. However, this may not be an accurate reflection of actual job losses, especially since the growth of informal production networks has not been officially recorded, including unregistered operations at the level of the household. These informal sector producers, including home-workers, operate outside industrial council agreements and are not constrained by Bargaining Council wage rates. Furthermore, there has been a noticeable trend of subcontracting production to low-cost labour areas such as peri-urban and decentralised regions (such as the former Bantustans), and to countries such as Malawi and Mozambique, using small, often unregistered, CMT manufacturers.

2.1 *Key Challenges Facing South African Apparel Manufacturers*

The South African retail sector is highly concentrated. The bulk of the market is controlled by a relatively small number of major retail chains (i.e. Edcon, Pepcor, Woolworths, Truworths, Foschini Group and the Mr Price Group) (see Box 1). The size and market power of the large retail chains enable them to dictate the terms of their engagement with local suppliers. As a result, the large retail chains are able to bargain down manufacturers' prices. The substantial power in the hands of the retailers also provides them with the scope to reshape supply networks. In recent years, the retailers have pressured garment producers to reduce lead-time, i.e. the duration of time between when an order is placed and a delivery is made. The middle to upper-end of the SA clothing market has become characterised by more frequent fashion changes, thus forcing manufacturers to sense and respond with speed to retailer demands and specifications. In such a context, "the *time* involved in meeting orders becomes as important as the cost" (*italics added*) (Dicken 1998: 295). The repercussions of this shift to lower merchandise cycle times, reduced logistics costs and rapid response to changes in demand is likely to influence the adoption of new network-based ICTs.

² The South African trade policy regime has liberalised at a rate faster than that required by WTO regulations. Tariff protection, trade restrictions and an export incentive scheme that protected the clothing industry until the early 1990s have been dismantled.

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The big retailers are placing stricter inventory management demands and bigger financial risks on manufacturers to “supply consumer goods more quickly, more cheaply, and in a greater variety than in the past” (Gereffi 2000: 48). Manufacturers, therefore, need to have rapid response, integrated ICT systems in place to cope with these challenges. Production runs have become shorter and more frequent with an increase in variety and style to cope with increasingly more diversified consumer demand. As a result, speed of delivery is important in determining the competitiveness of a garment producer. Harrison and Dunne (1998: 27) assert that “Supply chain problems with regard to delivery reliability, quick response and flexibility are impacting negatively on the potential competitiveness of the industry”. Manufacturers are now being forced to restructure their operations to drive out inefficiencies in the supply chain and to acquire a competitive edge over their rivals.

The South African apparel retail sector is more competitive than ever, and has become increasingly price sensitive. Each manufacturer has to meet a ‘price point’ as specified by the retailer, so the entire production system is shaped by the limit the ‘price point’ represents. Since the mid-1990s the tag prices of garments asked of buyers have not changed greatly. This, in no small part, has been influenced by the flood of cheap garments into South Africa from low-wage countries, particularly in the Far East, as a result of rapid post-1994 trade liberalisation. From the perspective of clothing manufacturers, the constancy of the price point, while their production costs increase, represents the formidable power of the retailers in the apparel value chain. Manufacturers find themselves in a vicious double bind: they have to achieve higher levels of performance for their customers whilst simultaneously incurring lower costs in production. The pressure is on producers to price aggressively and still make a margin.

Arms-length market relations combined with asymmetrical power relations characterise the buyer-seller relationship in the apparel value chain. Harrison and Dunne (1998: 40) argue that:

If there is one crucial element about the nature of supply chain relationships which needs to be highlighted, then it must be the critical lack of consultation and reciprocal flow of information between firms and their suppliers and customers. The arms-length nature of relationships within the clothing supply chain is a major problem when considering the importance of developing inter-firm relationships to improve overall manufacturing competitiveness.

BOX 1: The South African Apparel Industry: A Macro Perspective (1998 Figures)

- 8 000 retailers, employing 50 000 people.
- Domestic apparel retail sales – R25 000 million.
- Approximately 1 600 manufacturers (formal sector), employing 133 000 people. If the informal sector is included, this figure could rise to 200 000 people. Total production – R9 650 million (value of actual sales).
- Apparel imports (f.o.b) – R931 million; Apparel exports (f.o.b) – R772 million.
- South Africa sourced 62.78% of its total apparel imports from just three countries, i.e. Malawi, China and India respectively. The US (42.3%) and the UK (32%) are South Africa's two main export markets.
- Five retail groups account for 50% of turnover.³
- Over the past four years, the industry has shed 20% of its labour.

Source: Clofed (2000: 62, 63, 65, 81)

The two major challenges facing the apparel industry are: (1) to improve efficiency, and (2) to achieve international competitiveness. To meet these challenges, buyers and sellers will need to forge closer partnerships to better manage logistics and supply chain management in the garments industry. The long-term challenge for South African garment-makers is to achieve: (1) strategic agility, i.e. flexibility to adapt to changing market dynamics, evolving customer needs and new channels of competition; (2) tighter control of inventory in their supply chains; (3) improved ability to dynamically respond to changing customer delivery requirements in the supply chain; and (4) better integration with input suppliers to efficiently adapt to fluctuating demand. Internet-enabled, integrated supply chain management and logistics will not, in and of itself, guarantee prosperity and innovation in the South African apparel industry. But, it is fundamental to sustained competitive success.

2.1 Export-Orientation

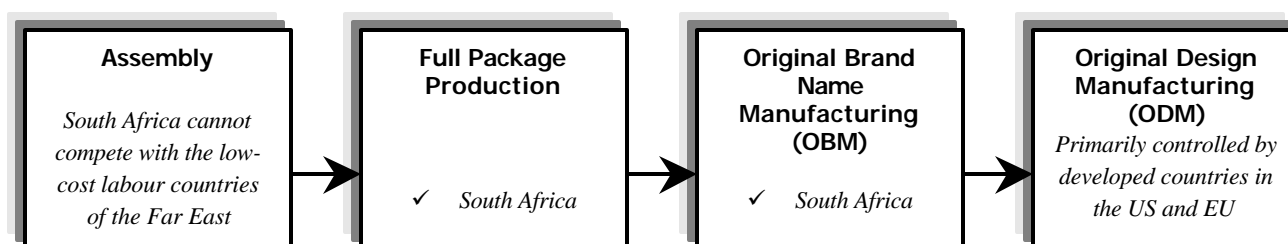
To grow and develop, the South African apparel, manufacturing sector needs volume business and long-term pipeline relationships rather than one-off orders. The challenge for South African garment-makers is, therefore, to develop and expand the export market, since an export-oriented growth path offers the most promise for becoming the key driver of employment and output growth in the industry. Currently, SA apparel firms link in at the intermediate level in global-scale

³ In 1991, the top five retail chains, i.e. Edgars, Wooltru, Pepcor, Foschini and OK accounted for approximately 58% of clothing retail sales (Altman 1994).

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value chains, where there is little scope for extracting profitable rents in high value-added segments such as design and marketing (Figure 1). South Africa is unable to compete in the assembly segment with low-wage countries like China, which, for example, is able to produce a basic garment at a price 79% lower than the local one (Financial Mail, 9th June 2000). South African clothing manufacturers export full-package garments primarily through private label lines (i.e., brands sold exclusively in a particular department store, such as JC Penney or Bloomingdales) or brand name licensing (such as Jasper Conrad or Yves St Laurent) (Figure 1). A small portion of exports also include South African brands such as “Balu” and “Naartjie” which are destined for small overseas niche markets (Figure 1). Gereffi (2000) refers to this form of garment export activity as original brand name manufacturing (OBM). According to Gereffi (2000: 15) “the barriers to entry for each export role are more demanding as one moves along the industrial upgrading trajectory”.⁴

FIGURE 1: A Typology of Export Roles in the Apparel Industry



Source: Based on Gereffi (2000: 14)

The South African apparel industry’s export growth potential will depend on its ability to: (1) enhance the quality of its garments; (2) identify new niche markets; (3) manufacture garments with greater design content; (4) diversify its product lines to include more fashion-oriented, innovation-driven garments, particularly women’s wear⁵; (5) establish a set of working relationships with foreign buyers (retailers, branded apparel manufacturers and marketers) who are interested in sourcing full-package garments from South Africa; and (6) meet the demanding price, quality and delivery (timeliness and accuracy of supply) standards of the export markets.

South Africa needs to develop new and better networks with overseas retailers and marketers in order to compete with East and South Asian suppliers for the lucrative European Union and North American apparel market. The information flows and learning potential associated with the buyer-seller links are critical for upgrading apparel manufacturers (Gereffi 1999: 52). Gereffi (1996a) cites the example of successful East Asian producers, such as the Fang Brothers in Hong Kong, who have over time become major brand name competitors to their US clients. World class information

⁴ In terms of, for example, skills and capabilities.

⁵ In higher fashion segments of the value chain, quick production turnaround and rapid response to changing fashion styles are crucial.

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systems (WCIS) are becoming important for managing the export pipeline effectively. The complexities of exporting place a premium on flexible, robust, scalable, digital communication and information links. The Internet could provide a mechanism for: (1) continuous learning and improvement; (2) streamlining operations; and (3) facilitating integration into advanced industrialised country markets. Moreover, the Internet could also act as a conduit for international best practice.

Gereffi (2000: 48) argues that “to facilitate adjustment and indeed survival in a volatile, export-oriented sector such as apparel, industrial upgrading typically requires organizational linkages to the buyers and suppliers in developed country markets”. The challenge for South African garment-makers is, therefore, to develop close, tight linkages and fashion strategic alliances with lead firms that control the high value-added, more profitable design and marketing segments in the buyer-driven apparel value chains. In these full-package sourcing networks, the lead firms (i.e. retailers and marketers) are the principal sources of technology transfer, knowledge and material inputs (Gereffi 1999).

Developing international relationships and linkages is critical to the overall development of SA garment-makers. The East Asian NICs became successful garment exporters through cultivating close, strategic relationships with foreign buyers, and through skilfully exploiting the dynamics of buyer-driven value chains (Ramaswamy and Gereffi 1998). E-business might play an instrumental role in establishing and sustaining global linkages and in so doing, provides a lever for linking into export markets. Integrating into sourcing pipelines for major retail chains in the US and the EU is crucial for the long term growth of the SA apparel manufacturing sector. There is potential, also, for Asian producers using SA as an export platform for fulfilling their global supply commitments. In fact, predictions of a major increase in SA clothing exports to the US is predicated on the assumption that Asian manufacturers will move their manufacturing operations to SA in order to take advantage of AGOA.

There is potential for SA manufacturers to play a critical (middleman) co-ordinating role in the full-package production process, by outsourcing export-oriented low-wage assembly to countries in sub-Saharan Africa, and possibly the Far East. The garment would then be re-exported to the EU or the US. Gereffi (1999) refers to this form of outsourcing as ‘triangle manufacturing’. Triangle manufacturing is a logistically complex undertaking which requires a tightly integrated network of lead firm and overseas manufacturers/CMTs. Under such circumstances, a dense web of digital Web-enabled communication links is essential to ensure an efficient pipeline.

SA’s two major apparel export markets are the UK and the US (Box 1). For example in 1996, the US (\$43.3 billion) and the EU (\$80.9 billion) together imported more than 70% of the world’s apparel imports (Ramaswamy and Gereffi 2000: 189-190). Garment-makers will need to leverage the two trade enhancement packages (i.e. SA-EU and AGOA) to compete for a share of the large branded and private-label segment of the US and EU markets, particularly the women’s fashion-oriented apparel market. Currently, clothing imported from South Africa accounts for only 0.1% of total US clothing imports (www.bdfm.co.za). For South African garment manufacturers, establishing strategic, long-term relationships with foreign buyers will take skill, time and resources to accomplish, especially since most EU and US buyers are currently concentrating their supplier networks.

3. E-BUSINESS: TOWARDS A CONCEPTUAL UNDERSTANDING

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Although the precursor of the Internet appeared in the late 1960s, e-business is primarily a product of six significant transformations in the global economy: (1) the globalisation of markets; (2) shift towards an economy based on knowledge and information; (3) the growing prominence of ICTs in the economy; (4) innovations in business organisation and practice (such as Just-In-Time Production, Total Quality Management, Knowledge Management, etc.); (5) the liberalisation of the telecommunications sector in primarily OECD countries; and (6) technological innovations such as email, the World Wide Web, Internet browsers, and the expansion in the volume and capacity of communication networks (*viz.* optic fibre, digital subscriber line technologies and satellites). These six factors are closely linked to the emergence of e-business.

The term e-business has no widely accepted definition. In a very broad sense, it means doing business over the Internet. We define e-business as *any form of commercial or administrative transaction or information exchange that takes place via an Internet-based, computer-mediated network*. E-business thus entails the application of the Internet to the complete value chain of business processes. Network computing is the technology that underpins e-business. E-business places a premium on openness, transparency and trust. The Internet offers a wide spectrum of potential commercial activities and information exchange (Figure 2). While this paper focuses largely on business-to-business (B2B) Internet interactions, it also briefly considers the implications of business-to-consumer (B2C) trade (the shaded blocks in Figure 2). There are two main reasons for this focus: (1) our concern is primarily with the potential of the Internet for enhancing inter-firm supply chain management and logistics, and (2) because current trends seem to indicate that B2B e-commerce will far outstrip that of business-to-consumer (B2C) e-commerce (Intelligence: Business in the Internet Age, May 2000).

B2B e-commerce encompasses a range of electronic interactions between a firm and its upstream and downstream trading partners. B2B e-commerce refers to procurement, logistics and administrative processes occurring between firms. Inter-business e-commerce can be divided into two categories: *open marketplace-based trade* and *direct trade between business partners*. The former takes place at various Internet-based auctions or exchange sites, whilst the latter occurs either through a firm's web site which has an online purchasing function or an EDI-type network. It has been argued that B2B e-commerce is likely to spread globally and grow rapidly primarily because of its potential for: (1) controlling *business costs* (associated with inventories, sales execution, procurement and distribution), (2) *connecting* to markets through greater geographical reach, (3) *value creation*, (4) increasing *productivity gains* and *systemic efficiencies* in the value chain, and (5) advanced *supply chain management and logistics* (Cohen et al. 2000; IBM 2000).

FIGURE 2: E-Business Matrix

	<i>Government</i>	Business	Consumer	Employee
Government	G2G	G2B	G2C	G2E
Business	B2G	B2B	B2C	B2E
Consumer	C2G	C2B	C2C	C2E
Employee	E2G	E2B	E2C	E2E

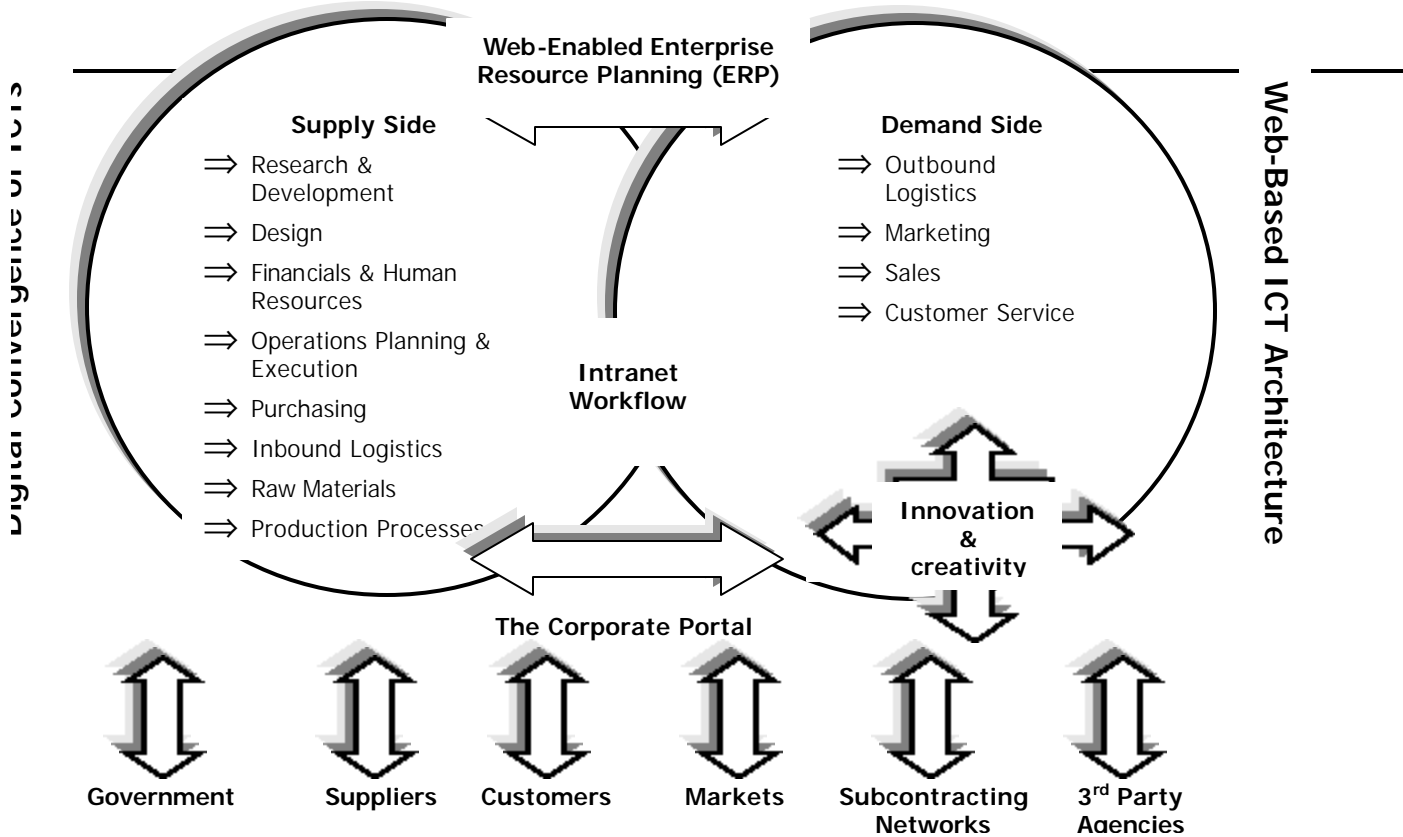
3.1 *The Internet*

Figure 3 illustrates how the Internet enables the networked or virtual organisation to connect, dynamically in real-time, the *supply and demand side* of the company. The Internet creates the possibility for firms to communicate, transact and collaborate with enhanced flexibility, and at a lower cost. Through the use of Intranets, companies link their employees, providing them with a new communication platform, and a new way to access up-to-date information that is relevant to them (Figure 3 below). The next step would be to establish an Extranet, in which suppliers and business partners have access to real-time and relevant information by linking into an enterprise's Internet system (Figure 4 below). Thus making it easier for the company and its constellation of suppliers, customers and partners to work together more effectively. The firm focuses on its distinctive capabilities, and then forms strategic alliances with other firms in the overall value chain. Increased dependence upon suppliers and customers thus becomes a requirement of the firm, and has a major impact on the buyer-supplier relationship (Figure 4).

B2B e-commerce holds great promise for the South African apparel industry in three key areas: (1) increasing the efficiency of internal processes (maximising operating synergies), (2) streamlining inter-firm linkages (exploiting systemic efficiencies) and (3) connecting to global markets (Figures 3 and 4). Dell Computer's Internet-enabled build-to-order business model, for example, illustrates the power of a fully integrated Internet-based assembler/production system (Magretta 1998). Apart from improving intra-firm and inter-firm process efficiencies, the Internet can also play a key role in facilitating supply chain learning and innovation. B2B Internet-based collaborative interactions and real-time communication is likely to sharpen the competitive edge of the participating firms, reduce information asymmetries, and improve the quality of information embodied in business relationships.

The struggle for competitive advantage will revolve around exploiting the *richness* and *reach* potential of the Internet in the apparel industry. Evans and Wurster (1999) state that *reach* is about access and connecting to customers and suppliers, i.e. deepening upstream and downstream linkages in the value chain, and *richness* refers to the depth and detail of information that the firm provides suppliers and customers, and is regarded as being important for building close relationships with trading partners (Evans and Wurster 1999).

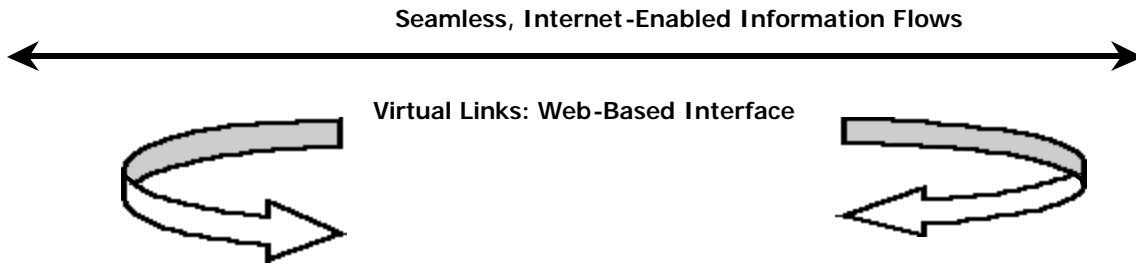
FIGURE 3: A Virtual Corporate Value Chain



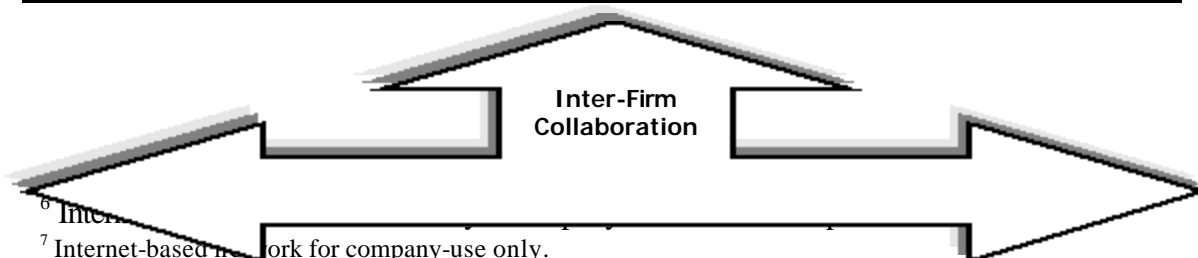
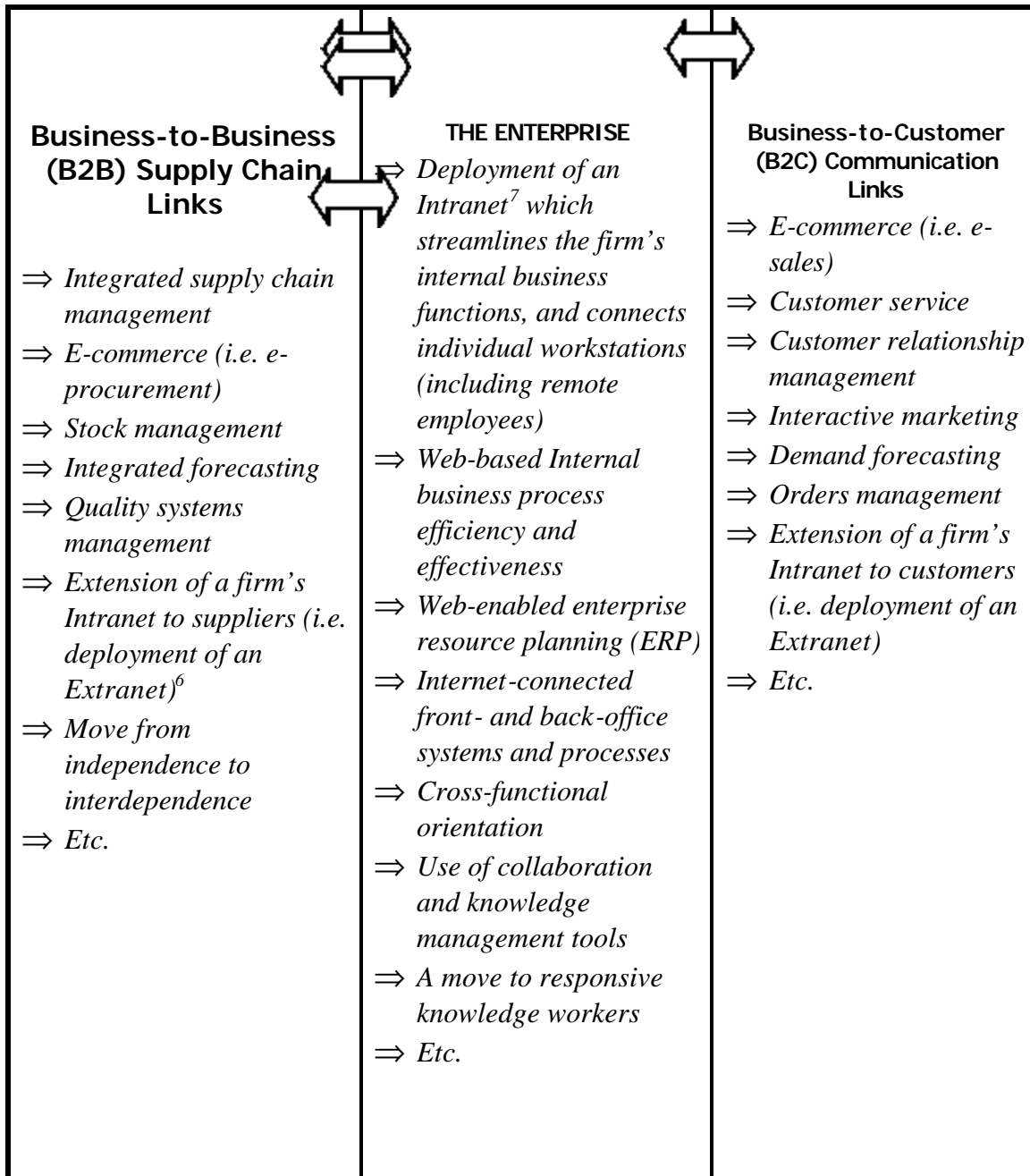
Characteristics of the Intra-Organisational Information System:

- ⇒ A corporate portal: a centralised home page with links to various departments and services. Includes corporate procedures, rules and regulations; as well as corporate news, views and vision.
- ⇒ The home page is used as the entrance to a network designed to pull all the old 'legacy' computer systems together.
- ⇒ Seamless information flows through tightly integrated ICT links, which promote connectivity and collaboration within the enterprise (B2E), including remote employees.
- ⇒ ICT-enabled internal and external processes to improve efficiency and effectiveness within the company.
- ⇒ Streamlined internal communications and business processes. The Intranet affects the way managers communicate with staff, and staff with each other.
- ⇒ An information-integrated channel: A high level of overlap and inter-dependency between front- and back-office systems.
- ⇒ The Intranet provides a way to build a corporate culture to bind employees together.
- ⇒ Changes in the organisation of work toward flatter hierarchies, the decentralisation of decision-making and semi-autonomous project-based teams. The Intranet enhances team-building, and encourages (within the company) the emergence of horizontal communities bound together by a common function or interest.
- ⇒ The Intranet is a quick way to help employees come to terms with changing business methods and terms of competition.
- ⇒ Knowledge management: involves efficiently connecting employees who know with employees who need to know, and converting personal knowledge into organisational knowledge. The Intranet provides the ideal platform for pooling the creativity, skills and knowledge of a workforce.
- ⇒ Running online training programmes for employees.

FIGURE 4: E-Business-Enabled Extended Enterprise



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⁶ Internet-based network for company-use only.

⁷ Internet-based network for company-use only.

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Suppliers

High Speed Networking Capabilities

Customer

A Powerful Virtual Extended Enterprise (Extranet)



Value-generating stream

4. THE PROSPECTS AND CHALLENGES OF E-BUSINESS FOR THE APPAREL INDUSTRY

4.1 *Business-to-Consumer (B2C) E-Commerce*

In contrast to the US and the UK, mail-order clothing sales have never been a significant component of the South African retail market. Perhaps this is one of the reasons why South Africans appear to be reluctant to purchase clothing via the Internet. In the apparel industry, catalogue companies such as Land's End and Victoria's Secret have made a relatively smooth transition to Internet-based e-commerce. There are two main reasons for their success: (1) it is likely to prove easier for consumers to switch from catalogue shopping to online shopping; and (2) their fulfilment systems are already designed for remote delivery.

Manufacturers are reluctant to sell directly to consumers via the Internet because they feel that they will then be in direct competition with their customers (i.e. the retailers). Levi's, for example, has stopped selling its jeans directly over the Internet (The Economist, 26th February 2000). The main reason for this was that its traditional retail channels objected to being bypassed. The perceived unprofitability of B2C is also a major barrier, with many once enthusiastic participants now lamenting the low sales volumes. Other obstacles include the logistics burden, i.e. the logistical challenges of packing and dispatching, cognisance must also be taken of the high rate of returned products. The cost of shipping, particularly a returned product in terms of processing expenses, damaged inventory and lost revenue is a deterrent.

Rosen and Howard (2000) point out that shopping, particularly for differentiated (higher-priced) apparel products, at a physical store is a social experience, which is for many a sort of ritualised event. Further it often fulfils a desire for immediate gratification. Apart from basic, standardised apparel, consumers may well find Internet shopping to be "isolating, unsatisfying, and boring" (Rosen and Howard 2000: 83). Moreover, consumers are wary of purchasing fashion-oriented apparel online since they cannot physically examine the garment, and they are unable to try-on the garment to assess how well it fits. Changing decades old physical shopping habits will take a long time.

South Africa has a number of virtual shopping malls such as ewarehouse.co.za, hypermall.co.za and virtualvillage.co.za. Consumers are, however, reluctant to divulge their credit card number over the Internet. Security concerns are a formidable obstacle to online purchases. A possible solution is the use of smart cards and digital cash. This notwithstanding, shopping still fulfils a social function that the Internet cannot easily replicate. In this sense, the home- or office-bound nature of online commerce offers little appeal. The Internet is not as effective as the shopping centre for browsing around, and for "producing the serendipity and impulse purchases" that come from visits to a physical store (The Economist, 26th February 2000). In essence, e-commerce does not provide the instant gratification that consumers often seek, primarily because it depends on separate delivery. The fashion industry constantly creates new fashions. It is this *inconstancy* of fashion which sets clothing retailing apart from the retailing of products which consumers are able to evaluate more objectively in terms of their material content. Garments are "high touch" goods. Consumers prefer to see and feel before they buy. However, catalogue experience in the UK and the US would seem to suggest that consumers will buy clothes without first trying them on if there are significant advantages: such as price, distance from a physical store, etc. There is also the distinct possibility that the Internet could well offer the possibility of "virtual fitting". However, this alone is unlikely to result in a substantial increase in online sales volumes. For example, the failed online sportswear retailer Boo.com created 3-D images to show the drape and look of clothing, but the technology was

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extremely slow to download and most home computers did not have the capacity to view the images. Internationally, Internet shopping has not progressed in apparel retailing, except for standard items like hosiery, socks, underwear and basic T-shirts.

For a few consumers buying clothing online may be convenient, especially consumers residing great distances from physical retail stores. Over time, the picture is likely to change as consumers become more familiar with and confident in the medium. Some people might well find it convenient to purchase online certain commodity items. Further, new technologies such as Web-cams, 3-D modelling, remote visualisation and simulation may be able to extend the range of clothing that can be sold online, although many complex apparel products will still require some element of direct contact.

4.2 Business-to-Business (B2B) E-Commerce

While much of the attention in the clothing industry is currently focused on selling directly to consumers (B2C e-commerce) over the Internet, it is in the sphere of supply chain management (SCM) and logistics (i.e. B2B e-commerce) that many of the real benefits of e-business can be found. E-business has precipitated the move from traditional internally focused logistics and SCM models to new models built on network-based, ICT-facilitated collaboration. This entails the sharing of critical and timely data on the movement of goods as they flow from raw material all the way to the end user. The net effect is end-to-end supply chain optimisation based on open communication between networks of trading partners.

In theory, e-business could provide the building blocks for an integrated ICT system, including: (1) a network of trading partners; (2) a single point of connection to all participants in the supply chain and production network; (3) a common digital platform to facilitate seamless communication and transaction processes among trading partners; and (4) real-time response capabilities to adapt to unplanned events in the supply chain (see Figure 4). The value lies in the connectivity and collaboration among the participants, especially the ability of manufacturers to engage in an active dialogue with retailers. As co-creators of value, they could, in theory, cultivate trust and relationships in the whole system.

B2B opportunities for South African apparel manufacturers include the following:

1. *Small business hubs*, especially linked to a large manufacturing company or retailer who sees this as a way to outsource production more effectively, and to improve the operational aspects of that network. The objective of which would be to foster broad-based sharing of information and insights. There is scope for value-creating potential, deriving a competitive advantage from exclusive collaborations, and from the proprietary sharing of information with suppliers.
2. *Upstream and downstream linkages*: Expanding EDI through Web-based links between retailers and their key manufacturers, design houses, CMTs and stores (both domestic and overseas). Small and medium apparel manufacturers will be less inclined to implement B2B e-commerce systems in the manufacturing pipeline in the

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short-term because of the perceived cost and infrastructural requirements. The uptake of e-business systems for the large apparel producers who are exporting is likely to be quicker.

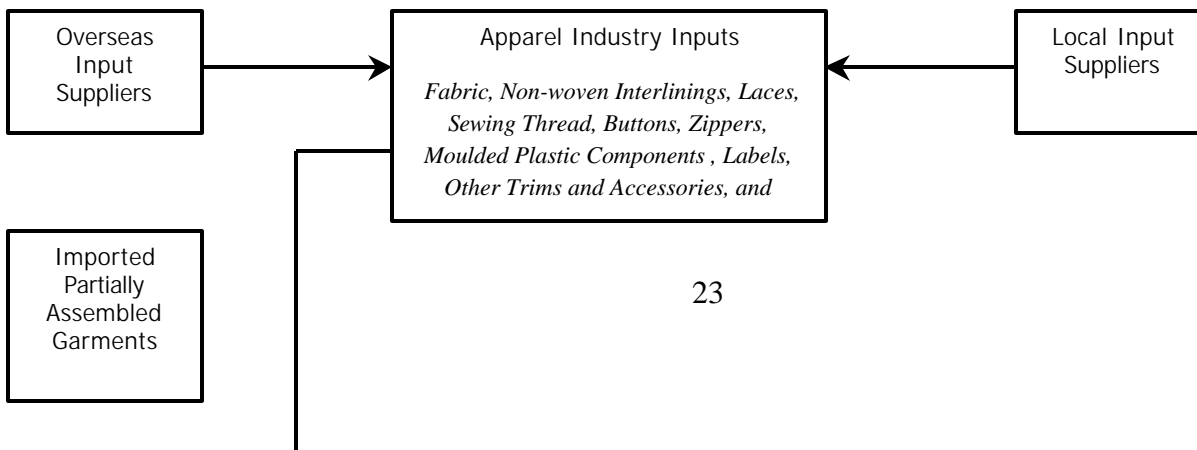
3. For exporters, *pipeline efficiency* is critical especially when they are buoyed by big volumes and important customer requirements like proof of origin, short lead times, deliver reliability, etc. Foreign buyers are likely to be the biggest motivator for ICTs, as they have been in things like computerised cutting technology and emailing of patterns to manufacturers. Manufacturers without e-business capability will find it very difficult to win orders from the US and the EU.

Electronic Data Interchange (EDI)

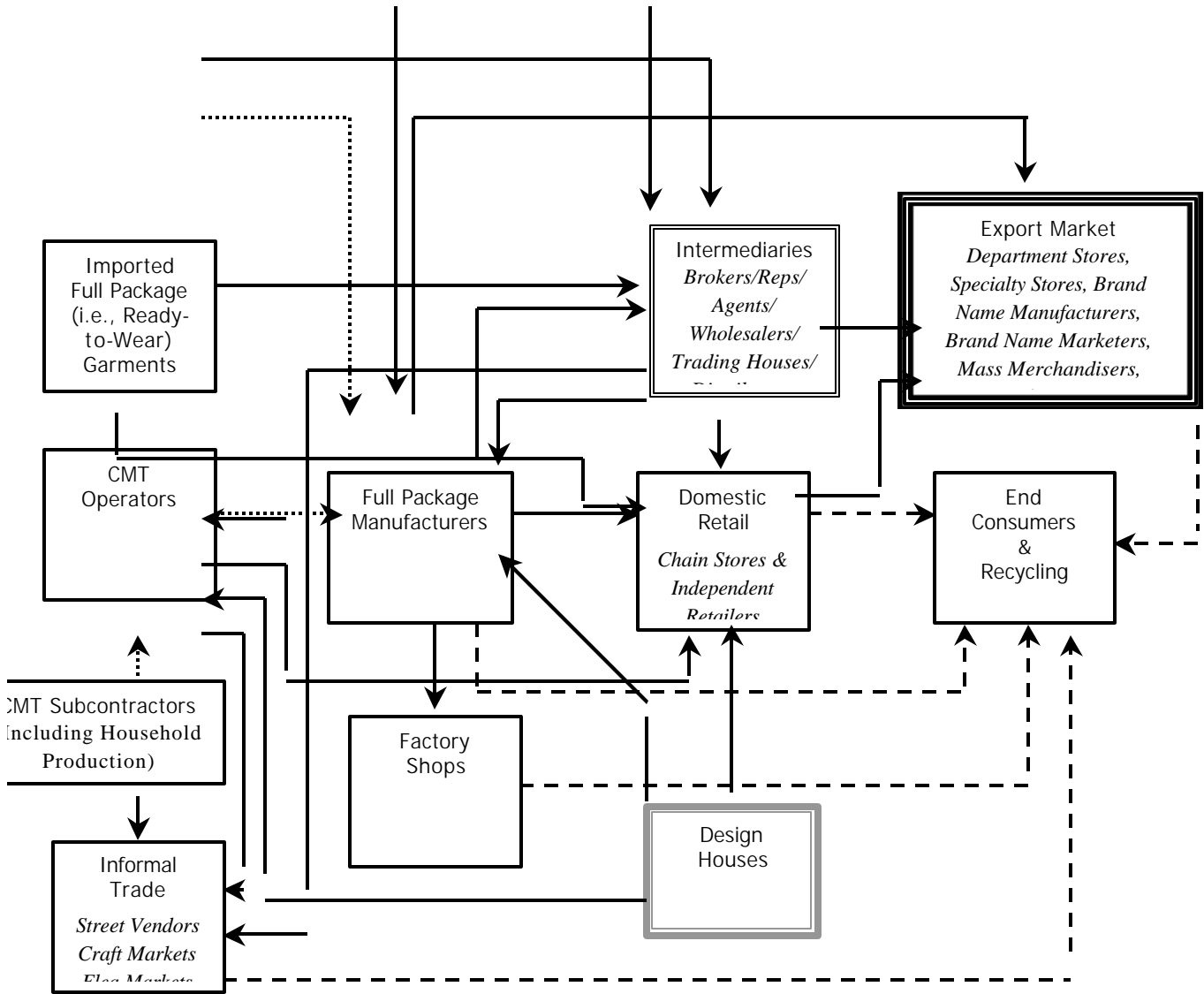
Through electronic point of sales (EPOS) data, suppliers can better determine levels of inbound supplies of raw materials, allocate the company's manufacturing activity across available production capacity, and plan transport routing for the most efficient coverage of market areas. EDI provides manufacturers with the ability to look up a customer's sales history to see which products have been popular and provide the customer with new fashions in these lines. This enables suppliers to tailor production to demand and shifting tastes, and so reduce the volume of stock discounted or 'marked-down' at the end of a season. EDI, for example, has dramatically reduced the order-delivery cycle. Product lines that are not popular with consumers are discontinued immediately. EDI can best be described as "an inter-organisational computer to computer exchange of business documentation in a standard machine processable format" (Sokol 1989).

EDI is a proprietary communication network that uses dedicated communication links, and requires expensive customised software. EDI entails considerable investment in dedicated software and in establishing proprietary networks, called value-added networks (VANs). For inter-firm communications to take place effectively, buyers and suppliers need matching software and hardware, a common language for communications, a standard layout for documents and a common communication network. A major limitation is the one-to-one nature of EDI transactions. Therefore it is not amenable for companies engaged in occasional (or ad hoc) purchases, or even for regular low-volume business. This is exactly the kind of business that SMEs are involved in. The major drawback with EDI is that it makes it uneconomical to link small suppliers into the system. Moreover, the cost and supply chain management advantages of EDI create a tendency for retailers to purchase from suppliers with existing, compatible EDI links. These forces tend to narrow and concentrate supply chains within a quasi-cooperative framework.

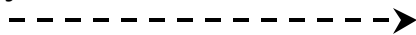
FIGURE 5: A Schematic Overview of the South African Apparel Supply Chain



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Key:



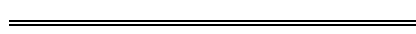
Business-to-consumer (B2C) trade links



Business-to-business (B2B) trade links



Subcontracting relationships



Scope for disintermediation?



Divesting/outsourcing manufacturing to CMTs, and concentrating on developing design and marketing expertise, and locating purchasing in a central office



Export Market

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Retailers possess detailed knowledge of consumer trends, knowledge that they exploit to their advantage in their interactions with suppliers. Decisions made in the retail sector often become the drivers of change in the structure of the clothing production system. There is great potential for retailers to use the Internet to increase collaboration across the garments supply chain. It should be seen as an extension of the existing EDI network. Retailers, for example, could provide their suppliers with access to their company's real-time sales and inventory information via the Internet. The objective of which would be to ensure effective collaboration between the buyers and sellers, timely replenishment and improve promotional planning in the retail stores. The retailers would also be able to use the Internet as a sophisticated forecasting system, which combines historical trends with current sales demand⁸ to predict how much consumers are likely to buy. The results of the forecasting exercise will then drive store replenishment and supplier orders. In this way, information on actual product sales, store inventory and shelf space is available to all of a retailer's suppliers who are equipped with Internet access.

Disintermediation

The success of Dell Computers and Cisco Systems is largely attributed to Disintermediation of the supply chain, where the company shrinks the supply chain by circumventing traditional middlemen (Magretta 1998). By dealing directly with customers and suppliers, there is the potential of lower purchasing and inventory costs, and better customer service. Disintermediation reduces transaction costs and improves responsiveness to customers' requirements. These improvements could lead to price reduction, increased margin and sales turnover. Of course, there is also potential for reintermediation through, for example, infomediaries (i.e., agents and brokers of customer and supplier information). Infomediaries could, in theory, play an important role in facilitating the buyer-seller process.

The South African apparel supply chain is characterised by a dense network of relationships between textile mills and other intermediate input suppliers, CMT factories, manufacturers, design houses, wholesalers, distributors, agents and retailers (Figure 5). In theory the Internet enables retailers and manufacturers to bypass the agents and wholesalers that normally co-ordinate the sale of products of overseas clothing manufacturers and textile mills into the SA market. At first blush the prospect of disintermediation is seductive, but its implementation may be problematic. The potential for disintermediation in the clothing supply chain is constrained by the subjective sensory factor. Personal involvement by facilitating agents in the buying/selling process is crucial in the apparel industry.⁹

The Internet, though, may well change the role and function of intermediaries, but is unlikely to mean the death of the middleman. Nonetheless the value chain will be characterised by fewer intermediaries. The disappearance of links will be caused by the erosion of entry barriers which were effective in the past. Such barriers comprise exclusive knowledge and geographical protection due to proximity. The new role of intermediaries are likely to become 'domain brokers', establish 'information portals' or to provide the virtual value chain with other new kinds of infrastructure. We may well see the emergence of B2B 'infomediaries' in the apparel supply chain, i.e. intermediaries who collect information, add

⁸ Collected from electronic point-of-sale (EPOS) terminals and systems.

⁹ Most manufacturers and retailers use experienced sourcing agents in the Far East to ensure quality assurance, delivery reliability, conformance to specifications, communicating design amendments, etc. Many SA apparel firms fear that the language and interpretation barrier makes the bypassing of the agent a risky proposition.

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value to it and sell it to firms who will find it most useful, thereby creating a platform on which buyers and sellers can do business.

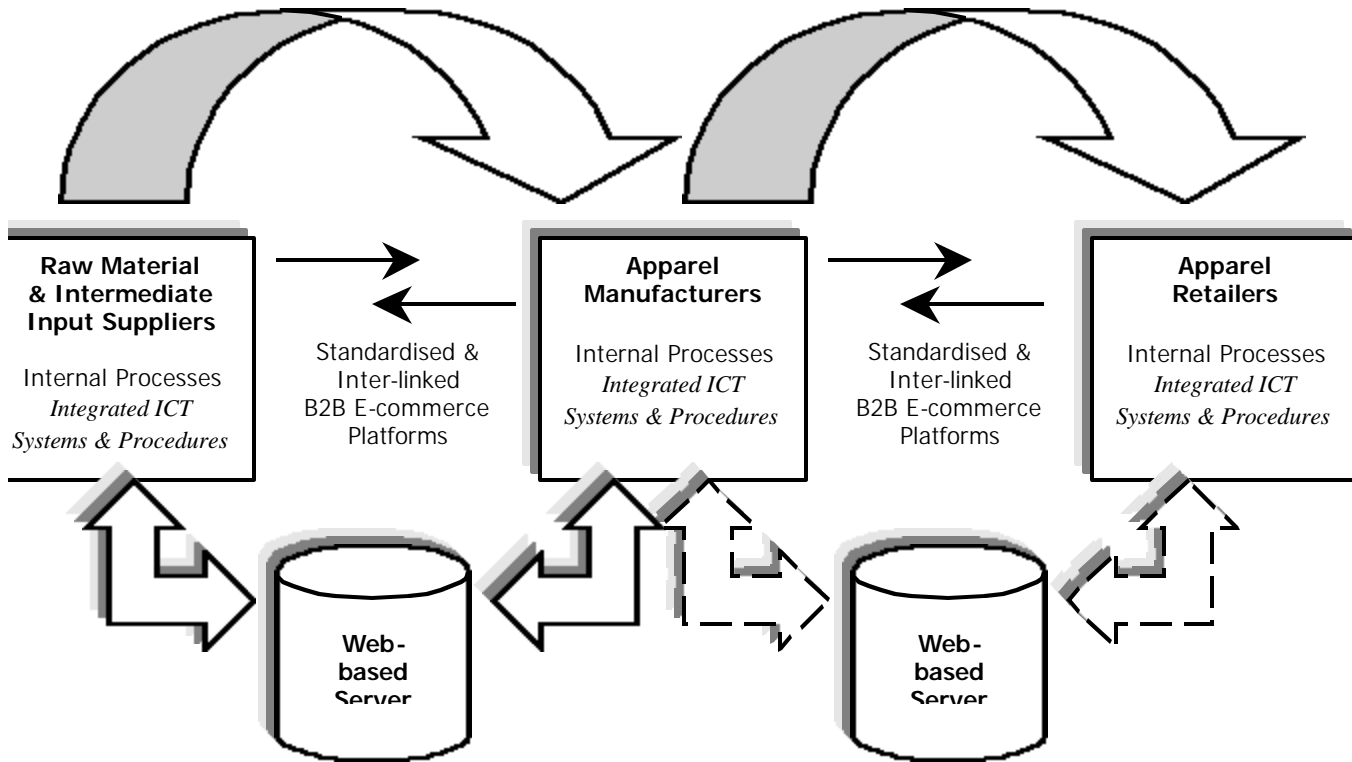
Virtually Integrated Supply Chain Management and Logistics

E-business facilitates more efficient stock management, leading to lower inventories as a ratio of sales. The Internet also creates value arising out of reduced product promotion costs, supply chain transaction costs and lead time for business transactions. As more firms participate in B2B e-commerce, the benefits increase due to network externalities (Katz and Shapiro 1985). In the long term, there is likely to be a migration of SCM from relatively expensive, closed EDI networks towards more flexible Internet-based systems.

In an attempt to increase their market share, the retail chains are beginning to offer a wider variety of apparel products, including basic products like men's shirts. This increase in product variety has, in turn, resulted in higher *demand uncertainty* (Abernathy et al. 1995). The retail chains are therefore less inclined to order large stocks of a particular product. Rather, the retail chains make small orders in the first instance, and then replenish depending on sales. Manufacturers are now faced with shorter lead times, and they will need to develop capabilities to respond to this change. Ramaswamy and Gereffi (2000: 205) put it best when they argue that "the consolidation of market power in the buyers, product diversity, and the higher demand uncertainty in product markets put pressure on the apparel supplier countries to adopt *information systems* to fill their orders efficiently" (italics added).

The concept of "lean retailing" has been pioneered by companies like Wal-Mart and JC Penney in the US, who have leveraged the technological advances of the 1980s and 1990s to pave the way for newer, more efficient ICT-aligned approaches to orders; distribution; forecasting, planning and organising production; and managing supplier relations (Abernathy et al. 1999). "Lean retailing" uses ICTs, especially network-based ICTs such as the Internet, to: (1) streamline and optimise the flow of information, materials and processes that are generated in the retail-apparel-textiles channel; (2) shrink the apparel supply chain by integrating a network of raw material and intermediate input suppliers, manufacturers and retailers; and (3) compress the time it takes from ordering a garment to its delivery for sale in the retail store (Abernathy et al. 1999). Lean retailing (Abernathy et al. 1999) appears to be similar to lean production (Womack et al. 1990) in that both concepts embody a 'pull-principle' in supply chain management.

FIGURE 6: “All Sewn Up”: Virtually Integrated Supply Chain Planning

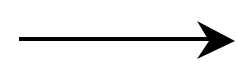


KEY:


Real-time Information Flows Between Retailers and Manufacturers: Orders, invoices, despatch/shipping documents, confirmation of despatch, payment instructions, statements, designs, products, prices, electronic point of sales (EPOS) data, finished goods stock, production plans, quality assurance data, forecasts, promotions planning, projected stock cover, delivery plans. High levels of ‘porosity’ (i.e. ease and speed of data flow).



Real-time Information Flows Between Manufacturers, Raw Material and Intermediate Input Suppliers: Orders, invoices, despatch/shipment documents, confirmation of despatch, payment instructions, statements, products, prices, trading locations, specifications, production plans, work in progress, quality assurance, service levels, forecasts, projected stock cover, delivery plans. High levels of ‘porosity’ (i.e. ease and speed of data flow).



A Common Digital, Networked Platform for Joint Processes: Knowledge-enabled value creation will flow from adopting standardised best practice. Collaboration via joint physical (materials) and operational flows. Inter-organisational digital networking systems as opposed to the traditional ‘silo’ based approach.



Value Chain Partnerships: A move away from traditional ‘arm’s length’ relationships with stakeholders, which will entail a reconfiguration of the governance style and power dynamics in the apparel value chain. Emphasises trust-based models that reduces the threat of opportunism.

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The apparel industry is characterised by rapidly changing styles and volatile demand, reflective of the fickle nature of the fashion business. This has historically made it extremely difficult to forecast sales and order from suppliers. Concomitantly, the industry has a history of stock shortages, high inventories and costly markdowns (Abernathy et al. 1999). Lean retailing involves the use of quick response (QR) ICT systems that reduce risk and increase the revenues of the retailers, by putting pressure on manufacturers to manage inventory.

A critical challenge for garment manufacturers is, therefore, to develop the ICT capability to (1) respond quickly and efficiently to changing customer demand and the burgeoning proliferation of products in the apparel retail sector; and (2) respond with speed and flexibility to real-time orders. For example, drawing on electronic point of sales (EPOS) data (colours, sizes, styles and geographic sales) via EDI from lean retailers, like Wal-Mart, garment manufacturers are now able to replenish rapidly based on immediate and accurate information on product sales.¹⁰ Abernathy et al. (1995, 1999) found that garment manufacturers who are able to adapt to lean retailing practices are better placed to: (1) cut costs; (2) reduce inventory risk; (3) increase profitability through lower inventories; (4) shorten lead times; (5) lessen the possibility of close-outs; (6) make better decisions; and (7) improve their responsiveness to the constantly changing tastes and preferences of customers.

Sharing information between retailers and manufacturers is important. Retailers benefit greatly when they can see the manufacturers' production schedules, and manufacturers', in turn, benefit when they have access to the retailers' demand forecast, inventory and sales data for their garments. This makes it easier to plan ahead for the volume and timing of orders. They can react in real-time rather than waiting for information to trickle down. Thus providing a clear view of the balance of supply and demand.

South African retailing giant, Massmart, for example, has embraced the Internet to 'reinvent' its business. Massmart is a R10 billion conglomerate which owns Game, Dion, Makro and Shield. Mark Lamberti, Massmart's Executive Chairman, believes that e-business systems will raise margins through greater supply chain efficiencies (Financial Mail, 24th September 1999). Makro, for instance, uses a point-of-sale system to determine stock levels, and do collaborative forecasting with its suppliers. Makro currently allows its suppliers to access its database via the Internet in order to "examine sales information, check current levels of stock of their products, display outstanding orders and even provide delivery efficiency statistics" (Financial Mail, 24th September 1999). Eventually, Massmart plans to use the Internet for vendor-managed inventory (VMI) to enhance logistical efficiency in all its subsidiaries.¹¹

Sears Roebuck and Company, for instance, have made use of advanced ICT systems to build a fully integrated electronic supply chain that is faster and more efficient than the old 'physical' supply chain (www.sears.com).¹² Figure 6

¹⁰ Point of sales data is elicited through bar coding and point of sale scanning.

¹¹ VMI is a continuous replenishment planning system.

¹² The apparel and home products retailer in the US, for instance, operates a fully integrated electronic supply

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illustrates the flow of data and physical and operational flows across the virtual value chain. Integrated SCM is predicated on the belief that each trading partner is willing to co-operate and collaborate in the joint management of the virtual value chain. The value chain information flows can be divided into four broad categories: (1) transactions; (2) plans, forecasts and corresponding actuals; (3) reporting; and (4) supply chain performance (see Figure 6). Figure 6 presents a focused system of electronic communication that links all parts of the value chain, reduces uncertainty, wastage and obsolete inventory as speed of response is increased. Production can be ramped up or inventory shifted to meet variable consumer demand. Suppliers will be better able to plan their production and distribution activities, which should also enable a reduction in inventories and therefore working capital. The rationale adopted is one of demand-led just-in-time management strategies based on quick response, low inventories and rapid product changes.

We believe that integrated supply chain management will be most beneficial for core products (i.e., standardised garments such as lingerie, jeans, chinos, T shirts, etc.) that need to be continuously replenished. Information such as sales data, stocks, production, waste levels, supplies, capacities and lead times are shared both upstream and downstream in order to agree projected stock cover between raw and intermediate input suppliers, CMTs, manufacturers and the retailers. The objective is to ensure efficient replenishment by keeping costs, inventory levels, empty shelves and machine stoppages to a minimum. There is, thus, greater visibility across the supply chain among the trading partners (Figure 6).

Internet-Based B2B Trading Exchanges

The development of Internet-based B2B trading exchanges in the retail sector follows similar exchanges already operating in the automotive (Covisint) and chemicals (Chemdex) industries. There are at least two major vertical retailer-led trading portals on the Internet: GlobalNetXchange (which includes four of the top seven retailers in the world: Sears, Kroger, Sainsbury PLC and Metro AG, see www.ntxc.com) and WorldWide Retail Exchange (includes international retailers such as JC Penney, Marks and Spencer and Tesco). These B2B trading exchanges provide a platform for retailers and their suppliers to trade goods and services, and to streamline inter-firm communications. There is reason to believe, however, that the trading exchanges will not be as successful in the buyer-led apparel supply chain as it is likely to be for the producer-driven automotive supply chain. In the automotive industry, purchases of commodities over the Internet are based on a set of product specifications. In other words, the commodity is purchased on the basis of the suppliers providing an accurate description of the physical characteristics of the commodity, which often is also regulated by internationally agreed standards. The apparel supply industry, however, is characterised by unstandardised and rapidly changing product profiles. Moreover, the important (often subtle) physical characteristics of fashion clothing, i.e. the colour, texture, drape and overall 'look', is very difficult to accurately depict over the Internet. However, for core products and certain types of raw and intermediate input supplies there might well be a market opportunity for trading through B2B portals.

chain. Sears operates 839 full-line stores and 2600 off-the-mall stores, and has sales in excess of US\$40 billion. Sears trades electronically with over 5000 suppliers, and US\$6 billion of transactions flow through Sears electronic supply chain each year (www.sears.com).

4.3 *B2B E-Commerce: Challenges and Risks*

There are also risks associated with e-business, i.e. cost cutting, price-based supplier relationships and competitive switching. Electronic links theoretically make it easier for buyers to begin and end supplier relationships. This may threaten stable, long-term relationships as suppliers lose the protection afforded by familiar inter-firm relationships and the retailers' incomplete information about alternative supply sources. The pursuance of short-term price advantages and the concomitant "factory hopping" and "competitive switching", on the part of the retailers, marketers and brand name manufacturers, is, of course, at odds with upgrading the positioning of South African apparel manufacturers in global-scale value chains. Therefore, the building of trust, loyalty and reciprocity to reduce the threat of opportunism and to make it difficult to break long-term network relationships is important. Trust issues are likely to centre around access control, transaction privacy, information integrity and authenticity.

B2B e-commerce has its limits in the clothing sector, which is largely a physical world of resources that managers need to see and touch. The procurement of apparel requires a great deal of personal face-to-face involvement in the buying process. Buyers make an assessment of the suitability of the garment by physically handling and examining the product to be purchased. Attributes such as colour, texture, drape, etc. are crucial determinants of the buying decision in both the B2B and B2C markets. Personal contact, however, may not always be practical for global relationships. The challenge will be to integrate the Internet with the already formidable personalised communication networks. We are sceptical that electronic B2B marketplaces (like Covisint in the automotive industry) and auction websites will take root in the fashion garments industry. Although, there may well be a market for basic, standardised garments in B2B trade exchanges. Auction sites, however, are anathema to the whole ethos of the fashion clothing industry. Retailers and manufacturers catering to the lower-end of the market, where price competition is most intense, may, however, purchase stock clearances and distressed goods through an auction site. Nonetheless, the history of fashion apparel markets strongly suggests that personal touch will remain a key feature of the buying process.

Much of the supply chain efficiency that the e-business model depends upon is held hostage by the pace at which a firm's trading partners, from suppliers, customers to transportation companies, upgrade their own systems to complement the e-business-enabled firm. Implementing B2B e-commerce means asking hundreds of companies to conform their business practices to meet very precise standards for information flow. Considering that manufacturers and input suppliers are using different types of hardware and software, and are at different stages of e-business development, mandating and enabling total electronic compliance can be quite a daunting challenge. Furthermore, virtually integrated value chains create dependencies that, in theory, increase vulnerability to disruption at any one stage in a highly integrated chain. The repercussions of which are felt immediately throughout the value chain.

Factors likely to impede the adoption of B2B e-commerce in the South African apparel manufacturing sector are:

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1. The fragmented nature of the apparel production sector.
2. Low annual investment in ICTs. Only the big corporations tend to spend on ICTs to any significant degree.
3. The cyclical and seasonal nature of the fashion business.
4. Complexity involved in processing of the product (especially differentiated fashion garments) – does not adhere to international specifications.¹³
5. One-off orders for fashion-oriented products, which makes up the bulk of apparel orders in SA.
6. Local orders tend to be low-volume compared to the export market. Large, relatively predictable orders make up a small part of the apparel trade in South Africa, and it applies to mainly standardised or core products that are on a replenishment system.

Although some of the larger manufacturers are e-business enabled, most are not. For e-business to take place in the apparel industry, a critical mass of manufacturers and retailers must be “willing and able to manage their logistical or other interlinking processes in a common, standard way” (McGuffog 1999: 2). Many of the firms in the garments industry perceive information sharing as a loss of power. As a result they tend to keep their trading partners at arm’s length. Retailers generally do not divulge information on sales patterns, stockholding and planned deliveries to branch stores to the manufacturers. Such internal data is deemed to be confidential and secret. Moreover, manufacturers are often at the mercy of retailers who change order quantities and/or timings unexpectedly. Manufacturers, therefore, incur extra costs in trying to respond quickly to an amended order within a tight time frame. This suboptimal outcome could have been avoided if retailers were willing to share data on sales, forward projections and stock cover.

¹³ Differentiation strategies include branding of products, specialisation in the use of certain fabrics only, or offering unique designs.

5. METHODOLOGY

The basis of the empirical data and analysis that follows is a series of open-ended, face-to-face interviews with 21 apparel manufacturers; four apparel retail groups and seven individual retail chains, covering 17 separate retail chains in total.^{14, 15} Most respondents were either IT, marketing, purchasing, planning or merchandising managers/directors. All of the major retail chain groups were interviewed, except one major retail group that targets the BC and CD market which declined to participate in the study. The sample of manufacturers were drawn from the three major centres of apparel production in South Africa, i.e. Durban, Johannesburg and Cape Town. The manufacturers were identified through the Clofed (2000) handbook and through leads provided by key informants. Limited resources (time, staff and funds) prevented us from expanding the sample of apparel manufacturers.

Initially, we conducted several personal interviews with a number of industry experts. These included:

1. Ms Jodi Kraus Robertson: ITI, a marketing trends consultancy
2. Mr Hassim Randoree: President of the South African Clothing Federation (Clofed)
3. Mr Len Smart: Executive Director of the KZN Clothing Federation
4. Mr Gavin Hartford: Jay & Jayendra (PTY) LTD, a consultancy
5. Mr Henk Campher: South African Clothing and Textile Workers' Union (Sactwu)
6. Mr Jack Kipling: Export Council for the South African Clothing Industry
7. Ms Keryn House: Perry & Associates, a business strategy consultancy

On the basis of the experts' recommendations we decided to target large manufacturers, especially those who are currently exporting, as well as the major national retail chains.¹⁶ Based on their experience, the experts believed that these large enterprises were more likely to: (1) have a fairly sophisticated IT infrastructure; (2) be using electronic information and communication technologies, including EDI and the Internet; (3) be trading online; and (4) have an e-commerce strategy, or at least be discussing the potential of e-commerce for their firm and the supply chain itself. Moreover, the lead firms in the apparel value chain are strategically placed to provide industry-wide insight into the prospects, challenges and uptake of e-business for the South African clothing industry. The opinions of the key informants are echoed by Salinger et al. (1998: 77) in their study of the KZN and Western Cape clothing industry:

¹⁴ A retail group refers to a holding company which has two or more retail chains under its control.

¹⁵ Confidentiality agreements with the respondents prevent us from identifying the apparel manufacturers and the retailers that were interviewed.

¹⁶ Two smaller export-oriented manufacturers were selected, however, because we felt that their inclusion would provide critical insight into how exporters connect to UK and US niche markets.

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Very few firms...use information technology with any level of sophistication, making it difficult for them to track projects, materials, suppliers and customers in any kind of transparent way. Only the bigger firms had any sort of computer aided manufacturing system in place.

The initial response by the retailers and manufacturers to the idea of an e-business survey in the apparel industry was mixed. Many firms claimed not to be currently engaged in e-commerce, while some stated categorically that e-commerce has nothing to do with the clothing manufacturing sector. To overcome resistance to the study, the researchers explained that the purpose of the study was not just to find out whether the Internet is being used for B2C and B2B online trading, but also to understand the nature of the buyer-supplier linkages and the mode of communication and information flows in the apparel value chain. This was done telephonically, and also in many cases we faxed and/or emailed a brief project description to the firms. The interviews generally lasted between 45 and 90 minutes, and largely followed the pattern of an open-ended discussion. An interview schedule was used to guide and focus the discussion. The discussion was largely qualitative in nature, which is in keeping with the exploratory nature of the study.

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6. EMPIRICAL FINDINGS

6.1 Retailers' Experiences and Perceptions

TABLE 1: A General Profile of the Retailers (N=11)

	Ownership	No. of Employees	Market Segments¹⁷	Exports¹⁸	Supplier Base (% Local)	Supply Chain Development Programmes
tail Group 1	JSE Listed	180	AB-BC (2 chains)	No	50% (local)	No
tail Group 2	JSE Listed	3 000+	AB-BC (2 chains); and BC-CD (1 chain)	No	70% (local)	No
tail Group 3	JSE Listed	10 000	AB-BC (1 chain); BC-CD (2 chains)	No	60% (local)	No
tail Group 4	Subsidiary of a Domestic Company	500	BC-CD (2 chains)	No	-	No
tailer 1	JSE Listed	1 700	AB	Yes [#]	-	No
tailer 2	Private Company PTY (LTD)	300	BC-CD	No	-	No
tailer 3	Private Company PTY (LTD)	300	CD	No	40% (local)	No
tailer 4	JSE Listed	5 000	AB-BC	Yes [*]	90% (local)	Yes (but limited)
tailer 5	JSE Listed	7 000	AB-BC	Yes [*]	90% (local)	Yes
tailer 6	Private Company PTY (LTD)	350	CD	No	50% (local)	No
tailer 7	Subsidiary of a Domestic Company	841	BC	No	70% (local)	No
AVERAGE		2651.9		27.3%	65%	

¹⁷ We use the following three income categories to segment the South African apparel consumer market: AB (high-income), BC (middle-income) and CD (low-income).

¹⁸ Exports are occurring through the retail chain supplying locally sourced merchandise to franchise stores located outside the country.

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* Franchise stores are located in sub-Saharan Africa and the Middle East.

Franchise store is located in Australia.

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TABLE 2: An E-Business Snapshot of the Retailers (N=11)

	ERP ¹⁹	EDI	Internet Access	Website	Intranet	Extranet	B2C Online Trading	B2B Online Trading
Retail Group 1	No	No	Yes	Yes	No	No	No	No
Retail Group 2	No	No	Yes	Yes	Yes	No	No	No
Retail Group 3	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Retail Group 4	No	No	Yes	No	No	No	No	No
Retailer 1	Yes	No	Yes	No	Yes	No	No	No
Retailer 2	No	No	Yes	No	No	No	No	No
Retailer 3	No	No	Yes	No	No	No	No	No
Retailer 4	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Retailer 5	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Retailer 6	No	No	Yes	Yes	No	No	No	No
Retailer 7	Yes	Yes	Yes	Yes	Yes	No	No	Yes
TOTAL (% YES)	45.5%	36.4%	100%	63.6%	54.6%	0%	27.3%	36.4%

TABLE 3: Ownership (N=11)

	ERP	EDI	Website	Intranet	B2C Online Trading	B2B Online Trading
Ownership						
JSE Listed (N=6)	66.7%	50.0%	83.3%	83.3%	50.0%	50.0%
Subsidiary of a Domestic Company (N=2)	50.0%	50.0%	50.0%	50.0%	0.0%	50.0%
Private Company PTY (LTD) (N=3)	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%

TABLE 4: Firm Size (N=11)

	ERP	EDI	Website	Intranet	B2C Online Trading	B2B Online Trading
No. of Employees						
<1000 (N=6)	16.7%	16.7%	50.0%	16.7%	0.0%	16.7%
>1000 (N=5)	80.0%	60.0%	80.0%	100.0%	60.0%	60.0%

TABLE 5: Market Segment (N=20)²⁰

¹⁹ *Enterprise Resource Planning (ERP)*: an integrated system of operation applications encompassing contract and order management, distribution, financials, HR management, logistics, production and sales forecasting.

²⁰ N exceeds 11 because some firms target more than one segment of the consumer market.

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	ERP	EDI	Website	Intranet	B2C Online Trading	B2B Online Trading
Market Segment						
Upper-income (N=6)	66.7%	50.0%	83.3%	83.3%	50.0%	50.0%
Middle-income (N=8)	50.0%	50.0%	75.0%	62.5%	37.5%	50.0%
Low-income (N=6)	16.7%	16.7%	50.0%	33.3%	16.7%	16.7%

The diffusion of e-business in the retail sector appears to be a function of ownership, firm size and market segment (Tables 3-5). However, since we are dealing with relatively small numbers caution is advised when reaching conclusions. The results are nonetheless suggestive. As far as ownership is concerned, it would seem as if JSE listed firms are more likely to have adopted e-business technologies than firms which are a subsidiary of a domestic company, and to a greater extent, private companies (Table 3). Larger firms (i.e. firms which have more than 1 000 employees) show a higher uptake of e-business technologies than smaller firms (i.e. firms with less than a 1 000 employees) (Table 4). Market segment in the retail link also seems to be an indicator of a firm's adoption of e-business technologies (Table 5). Retail chains operating in the AB and BC market segments were more likely to have ERP, EDI and a website, and to be currently engaged in online trading, than retail chains in the CD market segment.

TABLE 6: B2B E-Commerce: Retailers' Views and Experiences

Anticipated Benefits of B2B E-commerce:

- ⇒ Exposure to global markets
- ⇒ Shorter lead times
- ⇒ Inventory reduction
- ⇒ Revenue/profit enhancement
- ⇒ Procurement cost reduction
- ⇒ Streamlining the supply chain
- ⇒ To make pipeline exchanges more direct
- ⇒ Speed
- ⇒ Increase in efficiency and productivity
- ⇒ To broaden international sources of supply (i.e. to become more visible to international manufacturers)
- ⇒ To build relationships with suppliers through information flows

Internet used mainly for:

- ⇒ Communication and information exchange
- ⇒ Online banking
- ⇒ Accessing international fashion trends information
- ⇒ Research
- ⇒ To track and synchronise orders (limited use)

The Website:

- ⇒ To create a Web presence (marketing). Basically, an electronic brochure that acts as an advertising medium
- ⇒ To provide a profile of the company (its history, the executive, an information page - list of stores, online catalogues in some instances, promotional items, etc.)
- ⇒ To procure additional franchise business
- ⇒ Generally not interactive, and in most cases it has no transactional capabilities

Barriers to B2B E-Commerce:

- ⇒ The sensory factor, particularly for differentiated apparel products
- ⇒ Point of sale and inventory levels are regarded as confidential
- ⇒ Suppliers lack the necessary IT infrastructure
- ⇒ Mindset: Manufacturers' perceptions of costs
- ⇒ Idiosyncratic system architectures of suppliers
- ⇒ Culture: The apparel industry operates largely on the basis of personal communication, hands-on involvement in the buying process and long standing social networks
- ⇒ The innate conservatism of the industry

B2B e-commerce does exist in the SA clothing industry in the form of EDI linkages between the major retail chains and the large clothing manufacturers, and accounts for substantial B2B trade revenues. EDI is generally used by large clothing manufacturers and retailers for core business, i.e. regular bilateral trade between suppliers and customers for large, predictable orders. At present, EDI is used mainly for replenishing cosmetics, toiletries and core apparel products such as lingerie. The retailer agrees set stock holdings with the suppliers, and the suppliers procure raw materials and set production space around that.

Currently, only 36.4% of retailers are using the Internet or EDI to trade online with their suppliers (level 1 in Table 7). EDI linkages tend to be exclusively with local suppliers. Most retailers, especially those targeting the middle (BC) to

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upper-end (AB) of the market, are still largely locally based in their sourcing. This trade pattern is to some extent accounted for by the exchange rate and the logistics and risks associated with the importing of fashion-oriented apparel products. Although a few indicated that competitive pressures may well force them to investigate the option of sourcing from lower-cost countries with good track records on price, quality and response time. Retailers are now ordering smaller quantities of more differentiated apparel products from manufacturers. Over the past few years, even the largest apparel manufacturers have experienced a significant drop in their average purchase-order size. Thus many retailers are beginning to question the usefulness of EDI for sourcing small volume, fashion products. None of the retailers indicated that e-business capabilities on the part of producers is a condition of trade.

Retail Group 3 has shifted its EDI service from proprietary, value-added networks (VANs) to an open, Internet architecture from March of this year. The objective of which is to:

...streamline the whole system...make it more direct...to give manufacturers the ability to see what's coming through for them...or how their product is doing through point-of-sales information...to bring smaller manufacturers on board...as well as those who are currently not EDI linked...ultimately everyone will be linked via the Internet...and all the legacy systems will eventually fall away.

Retailer 5 is also implementing an Internet based B2B trade facilitation network:

From an IT or technical point of view we are convinced 100% that that is the way to go...our whole business will be on a Web based platform or architecture in the next 1 to 2 years...

Retail Group 3 and Retailer 5 are pushing through e-business initiatives, and in the long-term they expect to see improved supplier collaboration delivering improved gross product margins, better in-store availability and reduced inventory (see Table 6). When large retail chains such as Retail Group 3 and Retailer 5 move their purchasing and sales to the Internet, a ripple effect through the supply chain is likely to be the outcome. Since the retailers have invested a substantial amount of money in Web architecture, they are likely to be determined to get a return on it. Consequently, all of the retailers' trading partners immediately come under pressure to adopt an e-business infrastructure in order to create a sustainable digital trading network. Suppliers, particularly small producers, who resist the Internet, may be 'frozen out' of the supply chain.

There does not appear to be long-term loyalty between a retailer and its constellation of fashion garment suppliers (i.e. non-core products). The primary reason for this is that fashion trends change constantly, particularly in terms of fabric, style and colour. As a result, retailers often engage in one-time or occasional/ad hoc transactions with suppliers of differentiated fashion garments. Obligational contracting relationships involving trust does not appear to be a defining feature of the buyer-seller relationship in most cases. Most retailers did not have a conscious policy of investing in their producers' capabilities and developing what Sako (1992) calls 'obligational relationships'. The fact that the apparel supply chain is largely price- and, to a lesser extent, quality-driven rather than knowledge-driven may account partially for the lack of strong, mutual commitment between buyer and seller. Retailer 5 is an exceptional case. Retailer 5 is presently consolidating its supply base, and deals largely with preferred suppliers with relatively stable contracts. The

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emphasis here is on forging long-term partnerships with suppliers based on trust, interdependence and strong communication links in order to ensure high quality and prompt delivery. Retailer 5 mentioned that changing suppliers for the sake of short-term price advantages is problematic because of the high transaction costs involved as well as the potential risks associated with quality and delivery reliability.

A number of the large retail chains who previously owned dedicated manufacturing arms have now broken away from this 'dependency' relationship. The retail chains have encouraged their dedicated suppliers to operate independently and to diversify their customer base by competing for orders in the open marketplace. Retailer 5, however, has bucked the trend. The chain maintains a close working relationship with a large number of dedicated suppliers, many for which are 100% suppliers (or at the least, high capacity suppliers, i.e. 70% or more) committed to exclusively supplying the chain. Such stable, contractual relationships it is argued is convenient, and is necessary to ensure quality control, and protection of market secrets (designs, specifications, etc.). The chain in question also has an active supply chain development programme, and is committed to feeding back information to their suppliers in order to assist in upgrading their performance: "We are as dependent on their systems working as they are". Apart from Retailer 5, only Retail Group 3 seems to have any sort of supply chain upgrading system in place. Retailer 5, with its substantial market power, has been able to gently but firmly migrate a major portion of its supplier base to electronic interaction through a combination of information, education and persuasion. Although Retailer 4 does not have an active supply chain development programme it is prepared to take the initiative and upgrade its suppliers' IT capabilities:

The problem in this industry is that the suppliers are very unsophisticated...they may have a PC which runs a little accounting package...and that's about it...many of them don't have a system for their manufacturing or for their ordering or stockholding...it's all Excel...it's modularised rather than an integrated system...we will be part of that process of moving our suppliers forward...we will have to take a proactive role in assisting them to set up their systems...because quite frankly they don't know how...they don't have that kind of skills available...they will need a PC, a modem and be connected to the Internet...for them to access our portal...and we will have software like XML for them to download...we will never try and drive EDI to the clothing manufacturers...it will need to be a low cost solution for them...because generally they will not want to invest a great deal of money in IT (Retailer 4).

Most of the firms have a web presence (63.6%) (Level 1 in Table 7). Only 45.5% of the retailers had an enterprise resource planning (ERP) system that seeks to integrate business processes and management information across the organisation. The Intranets that the large companies have installed to connect different departments resemble ERP systems. None of the retailers are presently operating an Extranet, although a few indicated that this was a medium-term goal. This suggests that the retailers' prime focus is still on operational efficiency within the enterprise (Level 2 in Table 7) rather than trying to increase the organisation's effectiveness outside the enterprise by linking across the Internet with suppliers to create virtual supply chains (Level 3 in Table 7, below).

The innate conservatism of the industry appears to be a stumbling block to adopting e-business systems. These are typical responses:

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We are waiting for the technology to reach a level of maturity...rather than us having to do all the R&D...and spend a great deal of money upfront... (Retailer 4).

Yes we believe e-commerce is an opportunity...but we would adopt the “wait and see” approach...and possibly learn from other people’s mistakes as well as successes before we venture into it (Retail Group 1).

The principal obstacle to the accessing of EPOS data is not technological but an issue of mindset (see Table 6). Retailers are generally unwilling to provide their suppliers with a live link into their sales and stock levels because such information is considered to be ‘confidential’. According to Retailer 2: “We don’t want our competitors to have access to that information via our supplier”. Only 36.4% of retailers allow their suppliers access to information about how each of their apparel products is selling in their stores. Suppliers use authentication procedures involving user IDs and passwords to access the system, and they then use their own order numbers to trace their products so as to get an idea of stock balances.

TABLE 7: Levels of E-Business Integration

Levels	Level 1	Level 2	Level 3
Sphere	<ul style="list-style-type: none"> ● Functional orientation 	<ul style="list-style-type: none"> ● Integrating across functional departments 	<ul style="list-style-type: none"> ● Cross-enterprise involvement
Rationale	<ul style="list-style-type: none"> ● Departmental focus ● The purchasing & sales department, using EDI ● Individual departments developing specific Internet applications, e.g. a marketing website. 	<ul style="list-style-type: none"> ● Integrated business activities via Internet/Intranet applications. 	<ul style="list-style-type: none"> ● A virtual ecosystem that connects employees, suppliers and customers by extending existing EDI. ● The Extranet aims to: build trust and increase customer satisfaction; increase collaboration and knowledge sharing between customers and suppliers; and maximise synergies to lower costs, improve efficiencies and increase quality.
Levers	<ul style="list-style-type: none"> ● Technological infrastructure and software applications 	<ul style="list-style-type: none"> ● Business processes (process efficiencies within the firm) 	<ul style="list-style-type: none"> ● Cultivating knowledge workers ● Developing and exploiting intellectual capital to create opportunities ● <i>Building relationships</i>

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The vast majority of retailers do not provide their suppliers (even for replenishment stocks) with electronic access to their point of sales information. Core product suppliers are informed of replenishment orders through word of mouth (i.e. over the telephone or through the reps) or by fax.

Most of the retailers mentioned that a major barrier to trading directly and exclusively over the Internet is the personalised, tactile nature of the buying and selling process in the fashion industry:

We don't buy if we haven't seen the garment...you put the company at risk...seeing a digital photograph and the actual physical garment they are trying to sell you are two different things (Retailer 2).

It is very subjective...but that is the nature of this business...styles, the fabric, silhouettes and colours are of paramount importance...(Retail Group 3).

To be honest I don't know if there will be a great deal of benefits to be gained from B2B e-commerce for us...we are dealing with the buying and selling of items which basically have three main elements to them...the fabric which is a touch or feel thing, the colour and the styling...the first thing that a buyer does when a supplier brings a garment in...he feels it, looks at it, looks at the stitching...well you can't do that on the Internet (Retailer 7).

However, there is one retailer operating at the lower end of the market who reported that they are actively using the Internet for procuring commodity apparel products:

We've bought 25% of our stock over the past 12 months over the Internet...from web sites located overseas...mainly from India, Indonesia and China...to give you an example...Premier Export Corporation a company based in India...they send me on a daily basis whatever stock they have available...they operate from a small town which is about 400 to 500 kilometres outside Bombay...they send me catalogues...pictures of the items available...and details of available stock...colours, styles, etc...we have also purchased stock clearances through Web-based auction sites (Retailer 3).

The idea of buying apparel through auction sites was generally not an option for the vast majority of the retailers. Retailer 7's response is typical in this regard:

No we don't use auction sites...I simply wouldn't be inclined to try it...often the reason they land up in an auction is because the quality of the goods is below standard or the supplier has gone into liquidation (Retailer 7).

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A high degree of market power is concentrated in few large retail chains. The retailers are generally internally focused, and were very much promoting preserving the status quo. They were promoting risk aversion and control, and were generally not keen on virtually integrating the apparel value chain. The sharing of information with trading partners is seen as 'a loss of power'. The governance style adopted by the majority of the retailers tended to be static and reactive rather than dynamic and proactive. Retail Group 3 and Retailer 5 are exceptions. Several of the chains have experienced shrinking market share and reduced profits over the last five years. Success in the apparel industry is closely tied to maximising the turning of inventory (stock turns), i.e. the number of times inventory must be replaced per year because it is all sold. It is essential not to have unnecessary inventory or lack required inventory. The objective of the retailer is to maximise return on investment (ROI), with inventory being the investment. While in SA the average inventory turns 1 or 2 times a year, most successful international retailers turn their inventory 6 to 8 times a year. The main reason for this lower rate of inventory turns is the failure of the SA retail sector to adequately read and respond quickly to market changes. Occasionally, miscommunications or inaccurate forecasts would lead to either expensive or last minute product sourcing or lost purchasing opportunities.

Only 27.3% of retailers are currently selling apparel products directly to consumers via the Internet. The retailers reported that sales of apparel over the Internet were generally disappointing. B2C sales volumes were minuscule. According to Retail Group 3:

B2C for us is more of a long-term strategy...it's more of a strategic move...we are not really expecting to make money out of it...its only been up and running since late last year...the hit rate on the web site has been far less than we expected...and the number of purchases made on our web site is extremely low...the exposure rate is too little and the product range is probably too small and too basic...fashion styles could encourage people to visit it more often because it would be new and updated all the time...for basic products its just as easy to go into the store most of the time as there is isn't a price advantage...B2C e-commerce is currently very much a big company thing to do...it has to do with image...it is more a marketing tool than a commercial option...it is unlikely to generate sales and profits in the short-term.

6.2 *Manufacturers' Experiences and Perceptions*

At present, e-business is not a critical part of the vast majority of South African clothing manufacturers' business strategy. The manufacturers tend to be IT followers, and have a 'wait and see what happens' mindset. The responses of Manufacturers 14 and 19 are instructive in this regard:

People are not yet read for it...a very small percentage of people understand it and are comfortable with it...(Manufacturer 14).

I think that e-commerce for the clothing industry is in its infant stage...it will take a long time before firms apply the Internet to building linkages between supply chain partners...because there isn't confidence out there...also the demands in the market are so low. Firms don't really see the benefits of streamlined information flows...I don't think that manufacturers and retailers are really considering B2B e-commerce as a mechanism to

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resolve current logistic problems, reduce costs and boost productivity...it is still a new technology which needs to prove itself in practice (Manufacturer 19).

Only 47.6% of manufacturers have a website, and just 52.4% of apparel manufacturers are using the Internet or EDI to trade online with their customers (Level 1 in Table 7). The slow, imprecise movement of information up the supply pipeline and of products down it has meant that the manufacturing process must begin long before accurate information about demand exists. In other words, the South African apparel sector appears to be operating on the basis of guesswork. Four things are holding e-business back. The first is simply its newness: many manufacturers cannot even contemplate doing business through the Internet. The second is the lack of highly responsive supply networks that can deliver apparel components and services as needed. The third, and perhaps most important, is the lack of a critical mass of firms with e-business capabilities. Fourthly, manufacturers are very reluctant to allow their partners, suppliers and customers' access to their databases and inner workings. This implies a level of trust, openness and transparency not generally found in the apparel industry. This is indicative of a lack of trust in the apparel supply chain, and perhaps an unwillingness to expose a firm's weaknesses and mistakes. It has to do mainly with evolutionary path dependencies.

For manufacturers, an online B2C transition is perceived as a very risky shift in strategy. Hence the low percentage of manufacturers who are engaged in B2C trade (9.5%). This has to do mainly with perceived channel conflict and fear of alienating their customers (i.e. the retailers), as they will now be directly competing with their customers. A substantial percentage of manufacturers export (71.4%). The manufacturers claimed that they make use of agents to connect to exporting markets, rather than through digital links. Digital connections it is argued is important for contacting the agents, but not for direct communication to the overseas suppliers. Hence, we found no evidence of disintermediation in the production pipeline. All of the manufacturers were emphatic that they would not purchase through online auctions because of the high risks involved: bid-price manipulation, false product descriptions and failure to deliver merchandise. Furthermore, there is the view among the respondents that garments may not be as tradable over the Internet as other commodities such as automotive parts, computer software and laboratory products.

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TABLE 8: A Profile of the Apparel Manufacturers (N=21)

	Ownership	No. of Employees	Market Segments	Product Lines	Exports	Outsource to CMTs
Manufacturer	Private Company	500	N/A	Workwear & Uniforms	No	Yes
Manufacturer	Private Company	400	AB & BC	Ladies' & Men's Outerwear	No	-
Manufacturer	Subsidiary of a Domestic Company	1 000	AB & BC	Men's Formal & Casual Outerwear	Yes (45% of Total Sales) [US & UK]	No
Manufacturer	Subsidiary of a Domestic Company	800	AB & BC	Men's Tailored Clothing	Yes (40-50% of Total Sales) [UK & US]	-
Manufacturer	Private Company	300	BC	Ladies' Outerwear	No	Yes
Manufacturer	Subsidiary of a Domestic Company	60	AB	Children's Wear	Yes (95% of Total Sales) [UK & US] ²¹	No
Manufacturer	Subsidiary of a Domestic Company	1 000	BC	Lingerie & Ladies' Sleepwear	Yes (40% of Total Sales) [EU]	-
Manufacturer	Subsidiary of a Domestic Company	600	BC	Children's Wear	Yes (30% of Total Sales) [EU]	-
Manufacturer	JSE Listed	1 700	AB	Tailored Garments (Men & Women)	Yes [UK]	No
Manufacturer	Private Company	400	BC	Ladies' Outerwear	Yes [EU & US]	-
Manufacturer	Private Company	600	BC	Ladies' Outerwear	Yes [EU & US]	Yes
Manufacturer	Private Company	450	BC	Ladies' Outerwear	Yes [UK & US]	-

²¹ Secondary export markets: Spain, Italy, France, Japan and the Middle East.

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Manufacturer	Subsidiary of a Domestic Company	4 000	AB & BC	Formal Ladies' & Men's Outerwear	Yes [EU]	-
Manufacturer	Subsidiary of a Domestic Company	500	AB	Ladies' & Men's Outerwear	Yes [Australia, UK and US]	Yes
Manufacturer	Subsidiary of a Foreign Company	1 500	AB & BC	Men's & Women's Undergarments	No	-
Manufacturer	Subsidiary of a Domestic Company	65	AB	Children's Wear	Yes (25% of Total Sales) [US]	Yes
Manufacturer	Private Company	300	AB	Sportswear (Men & Women)	No	-

TABLE 8: A Profile of the Apparel Manufacturers (N=21) (Continued...)

	Ownership	No. of Employees	Market Segments	Product Lines	Exports	Outsource to CMTs
Manufacturer	Subsidiary of a Domestic Company	100	AB	Ladies' Outerwear	Yes [UK]	Yes
Manufacturer	Subsidiary of a Domestic Company	700	AB	Men's Outerwear	Yes (30% of Total Sales) [US, UK & Germany]	-
Manufacturer	Subsidiary of a Domestic Company	100	AB	Ladies' Outerwear	Yes [UK]	-
Manufacturer	Subsidiary of a Domestic Company	600	BC	Men's Outerwear	No	No
TOTAL (% YES)					71.4%	60.0%
Average No. of Employees		746.4				

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TABLE 9: An E-Business Snapshot of the Manufacturers (N=21)

	ERP	EDI	Internet Access	Website	Intranet	Extranet	B2B Online Trading	B2C Online Trading
Manufacturer 1	Yes	No	Yes	Yes	No	No	No	No
Manufacturer 2	No	Yes	Yes	Yes	No	No	Yes	No
Manufacturer 3	Yes	Yes	Yes	Yes	Yes	No	No	No
Manufacturer 4	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Manufacturer 5	No	No	Yes	No	No	No	No	No
Manufacturer 6	No	No	Yes	Yes	No	No	No	Yes
Manufacturer 7	Yes	Yes	Yes	Yes	No	No	Yes	No
Manufacturer 8	No	Yes	Yes	Yes	No	No	Yes	No
Manufacturer 9	Yes	No	Yes	No	Yes	No	No	No
Manufacturer 10	No	Yes	Yes	No	No	No	Yes	No
Manufacturer 11	No	Yes	Yes	No	No	No	Yes	No
Manufacturer 12	No	Yes	Yes	No	No	No	Yes	No
Manufacturer 13	No	Yes	Yes	Yes	No	No	Yes	No
Manufacturer 14	Yes	No	Yes	Yes	No	No	No	Yes
Manufacturer 15	Yes	Yes	Yes	Yes	No	No	Yes	No
Manufacturer 16	No	No	Yes	No	No	No	No	No
Manufacturer 17	No	No	Yes	No	No	No	No	No
Manufacturer 18	No	No	Yes	No	No	No	No	No
Manufacturer 19	Yes	Yes	Yes	No	No	No	Yes	No
Manufacturer 20	No	No	Yes	No	No	No	Yes	No
Manufacturer 21	No	Yes	Yes	No	No	No	No	No
TOTAL (% YES)	38.1 %	57.1%	100%	47.6%	14.3%	0%	52.4%	9.5%

TABLE 10: Firm Size

No. of Employees	ERP	EDI	Website	Intranet	B2B Online Trading	B2C Online Trading
≤100 (N=4)	0.0%	0.0%	25.0%	0.0%	25.0%	25.0%
101-500 (N=7)	28.6%	42.9%	42.9%	0.0%	42.9%	14.3%
501-800 (N=5)	40.0%	100.0%	40.0%	20.0%	80.0%	0.0%
800+ (N=5)	80.0%	80.0%	80.0%	40.0%	60.0%	0.0%

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TABLE 11: Exporting

	ERP	EDI	Website	Intranet	B2B Online Trading	B2C Online Trading
Exporting						
Yes (N=15)	40.0%	60.0%	46.7%	20.0%	60.0%	13.3%
No (N=6)	40.0%	50.0%	50.0%	0.0%	33.3%	0.0%

The results were not affected by ownership or channel of sales (marketing segment). Firm size and export orientation seems to have affected the diffusion of e-business technologies amongst the manufacturers (Tables 10 and 11). The larger producers are more likely to have ERP, EDI, a website and an Intranet than the smaller producers (Table 10). In addition, the larger manufacturers are more likely to be engaged in online B2B trading than the smaller garment-makers. Interestingly, though, none of the manufacturers with more than 500 employees are engaged in B2C online trading. Manufacturers who are currently exporting would seem to have a better uptake of e- business technologies than the non-exporters (Table 11). However, caution is advised as we are dealing with relatively small numbers.

TABLE 12: B2B E-Commerce: Manufacturers' Views and Experiences

The Internet is being used for:

- ⇒ Communication and information transfer (including designs and patterns)
- ⇒ Accessing international fashion trends
- ⇒ Information searches (suppliers and customers websites)
- ⇒ In a few cases, accessing customers' EPOS data
- ⇒ Online banking

Website:

- ⇒ A static information site, little more than a contact page
- ⇒ In most cases, no online trading capabilities. The website is not integrated with a firm's transaction processing systems.
- ⇒ Not integrated with legacy systems.

Anticipated Benefits of B2B E-Commerce:

- ⇒ More direct pipeline exchanges
- ⇒ Quick response time
- ⇒ Shortening lead times
- ⇒ Improve customer service
- ⇒ Speedier and more efficient communication
- ⇒ Better management of inventory
- ⇒ Access to global markets
- ⇒ Reduce supply chain costs
- ⇒ Process efficiencies
- ⇒ Increase collaboration with suppliers and retailers
- ⇒ To make systems transparent

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- ⇒ Productivity improvement
- ⇒ Order management/cycle time improvement

Barriers to use:

- ⇒ Cost
 - ⇒ Risk aversion
 - ⇒ Lack of e-commerce skills
 - ⇒ The daunting challenge of integrating and web-enabling legacy systems
 - ⇒ Low, if not non-existent, IT infrastructural capabilities of CMTs
 - ⇒ Customers' (i.e. retailers') mindsets: 'One-time low-volume buys' only rather than long-term partnerships based on collaborative strategies
 - ⇒ Fashion-oriented apparel is generally not replenished
 - ⇒ Customers with different IT systems: this means that a manufacturer with a diversified customer base will need to invest in several (often incompatible) systems (i.e. customer interfaces).
-

Manufacturers mentioned a number of factors that are likely to impede the uptake of e-business in the apparel industry (see Table 12). Many manufacturers are concerned that the goal of e-business is simply to squeeze them on price. They are also concerned that e-business will weaken/threaten their long-standing relationships with existing buyers. Some manufacturers questioned the need for e-business considering that retailers generally operate on short-term relationships, i.e. the relationship usually lasts for one season only. Manufacturer 15 even went so far to say that "a virtual operation is expensive in the short term, and unproven in the long term". The manufacturers also flagged the problem of diverse, incompatible ICT systems and infrastructures:

...but were you have a large number of suppliers manufacturing for us under license...and a very diversified customer base...with each company adopting a different IT system...the problem of interoperability is compounded (Manufacturer 14).

The importance of personal contact was underlined once again:

I think that personal contact in the clothing industry is vitally important...in our industry lots can be done electronically...there is certainly scope for IT to have a role in SCM for instance...but still personal contacts will always be important...you've got to feel and see the fabric or garment (Manufacturer 1).

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Also another constraint to a fully integrated system in the clothing industry...is that a lot of people see it as a touch, feel and see business...and they don't feel you can get that same experience from an impersonal medium such as the Internet...because they fear that they will lose the touch, feel and drape elements...although there is amazing drape capacity that is now available on the Internet...there is still that resistance to it...so unless the whole mentality of the clothing business changes...personal communication in the clothing industry will continue to be a major driving force... (Manufacturer 11).

I don't think IT links such as the Internet or EDI will ever supplant personal relationships...there is always going to be person-to-person exchanges in the clothing industry...IT links will complement and enhance the personal ties...but never will it replace them (Manufacturer 2).

Competitive pressures arising from globalisation and trade liberalisation have forced the larger apparel manufacturers to downsize and outsource to CMTs, which are made up primarily of small and micro-enterprises. Most manufacturers stated that the low IT capabilities of the CMTs could be seen as an obstacle to e-business taking root in the industry:

One of the major barriers to a fully integrated Internet link-up would be the CMTs...many of them are small operations...many don't even have a computer terminal let alone Internet access...(Manufacturer 11).

Moreover, some of the manufacturers have developed a network of offshore assembly arrangements with low-wage countries. The introduction of global buying network arrangements can be understood as a strategy to ensure international competitiveness, and as a defence against cheap imports. The spread of outsourcing in the apparel industry means that firms manage many more alliances, and underlines the importance of an integrated information system.

Apparel manufacturers are being forced to adjust their production arrangements in order to improve quality, maintain lower price, produce smaller batches of more varied products and respond rapidly to changing customer demand. The drive for competitiveness is leading to changes in inter-firm arrangements. The manufacturers mentioned that non-price factors such as quality, delivery reliability, quick response, flexibility and increasingly innovation are becoming critical competitive differentiators.

Apparel manufacturers are under pressure to improve their efficiency and quality levels to ensure long-term sustainability. Supply chain inefficiencies such as high inventory levels, and low levels of stock turns appear to be a problem in the industry:

The whole idea behind an e-commerce initiative would be to reduce stockholding costs because we hold an inordinate amount of stock purely to buffer the length of time it takes...and I bet you if you go and have a look at our suppliers they are doing exactly the same thing...but there are certain reassurances that need to take place...namely that if you are going to reduce your stockholding that the supplier actually processes the order quickly and makes sure that you get replenishment faster...other salient issues would include the accuracy of the orders...obviously the management thereof...also providing that information onto the customer itself...that the

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stuff is ordered...it's now in production...and when it's out of production...that's how the process should be...(Manufacturer 9).

In the apparel industry lead times range from three to six months. There does not appear to be a major difference in lead times between local and overseas suppliers. The long lead times are generally accounted for by the long wait for fabric delivery and the scheduling of production. Retailers and manufacturers ascribe the long lead times to 'the nature of the fashion business'.

Several of the manufacturers have fairly advanced information systems which provide an integrated view of each stage of the design, raw material procurement, production, marketing and sales process. Only two of them, however, allow the retailers to access their systems via the Internet so that their customers can track the progress of their orders. Likewise, very few of the manufacturers have links to the retailers' inventory and sales systems. The lack of a robust, flexible and secure IT infrastructure on the part of suppliers is a major impediment to e-business development. A major challenge appears to be the converging of legacy IT systems with the Internet. Convergence between front- and back-office systems is a necessary first step before a company moves into B2B e-commerce. It is only then that customer-facing and supplier-facing platforms can be put in place to leverage trade relationships. The absence of a common trading standard makes it difficult for buyers and sellers to easily exchange information electronically. Manufacturers feel that they would have to build a separate electronic interface for each retailer. This is both cumbersome and expensive.

Many of the manufacturers still have not integrated their internal systems; others (38.1%) that have invested in ERP systems have a firmer foundation. Some manufacturers claimed that they have not given external parties access to their systems because their systems are not integrated, it is still very much modular based. This is problematic considering that the aim of B2B e-commerce is not to just connect customers to a manufacturer's website but to connect them to the manufacturer's business, i.e. both back- and front-office systems. Further, ERP systems will need to be integrated with a company's supply chain and the interface with the customer. ERP provides an essential backbone for e-business processes within the organisation, but it will have to be extended out across the Internet. Linking with suppliers and customers through an Extranet will enable manufacturers to form a responsive supply chain. By not Web-enabling their enterprises many manufacturers are closing out options for responding to the marketplace, perhaps even without realising it.

The manufacturers' ERP (38.1%) systems and the Intranet (14.3%) are primarily being used to generate internal efficiencies and to obtain integrated management information within the firm (Level 2 in Table 7). They are not geared to receiving customer demand forecasts generated direct from retailers' EPOS terminals through the supply chain. This is especially important for promotions which are particularly volatile. And manufacturers also need to reach back through the supply chain to their suppliers in order to ascertain whether procurement lead times will allow a customer order or demand forecast to be met by the required date. In other words, manufacturers will need to extend the capability of their ERP systems and the Intranet to implement the concept of the 'extended enterprise' in order to gain competitive advantage (Level 3 in Table 7; also see Figure 4). The ultimate aim is to produce an integrated supply chain that can respond rapidly to changes in consumer demand. Presently, none of the manufacturers are operating an Extranet for cross-enterprise supply chain management.

7. CONCLUSION

Two separate issues arise out of the study. Firstly, supply chain management (SCM) appears to be a blind spot for many companies in the apparel industry. Secondly, most companies still do not regard the Internet as a key marketplace challenge, i.e. they do not regard e-business as critical to their success. The majority of clothing manufacturers have yet to embrace e-business in their strategies and corporate direction. Most firms that we interviewed do not have IT systems in place to support substantive online transactions over the Internet. This is not surprising considering that e-business is at such an early stage of development. Even so, we believe that the major obstacle to the uptake of e-business in the garments sector is the lack of awareness, on the part of senior management, of the potential and challenges of e-business. This explains, to some extent, the apparent lack of urgency on the part of the SA clothing industry apropos e-business.

The terms of competition and trade in the apparel industry have changed quite considerably over the last decade. Sustainable competitive advantage in the international garments industry is now determined by dynamic differentiation, networking and effective organisational learning. In the global economy competitive advantages are attached to process-oriented improvements, information flows and on agility. Fast learning and effective, coherent organisational responses have become crucial. E-business should be viewed as an enabling factor that facilitates industrial upgrading in the apparel sector without determining it. Richard Greenbury, Chairman of Marks & Spencer, puts it in a nutshell: "The Internet hasn't changed priorities. It has simply added another layer of urgency to an already established agenda" (Maruca 1999: 161).

There appears to be a lag in the implementation of B2B e-commerce in the South African apparel industry. This is in keeping with e-business trends in other developing countries (Kagami and Tsuji 2001). Despite strong theoretical arguments suggesting that e-business has much to offer the South African apparel industry (in terms of connecting to markets, productivity gains, potential cost savings and systemic efficiencies), the empirical evidence would seem to suggest that e-business in the garments industry is still largely uncharted territory. The impact of Internet-based B2B e-commerce on the apparel industry has been minimal, and firms are in no rush to put in place the necessary Web architecture. Moreover, with the possible exception of Retailer 5, the retailers are largely passive governors in the apparel value chain and are not exerting any real pressure on their suppliers to adopt e-business systems.

The uptake of e-business in the South African apparel industry remains decidedly cloudy. Yet we are guardedly optimistic that e-business will, on a broad level, change the basis of competitive advantage in both manufacturing and retailing. The value of e-business rests squarely on the ability of the firm to extend processes and integrate with other companies, and on a broader level, to integrate and consolidate the apparel supply chains. The question is whether this potential can be translated into reality for the apparel industry in South Africa. That is the critical challenge.

The SA apparel manufacturing sector is largely an IT follower, and very much a passive provider of garments. But the competitive landscape has changed to such an extent that it would be difficult, if not foolhardy, for the industry to continue in this static mode and expect to remain competitive. The adoption of e-business in the retail sector, however, is likely to be much greater since this is a service-oriented sector which is highly consolidated. Those companies which have experience using EDI will probably make the transition to e-business to streamline the supply chain faster than

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companies with no EDI experience. The major retail chains have sufficient bargaining power to significantly influence the adoption of e-business by their suppliers. The diffusion of EDI is a good example of this power configuration (Jimenez-Martinez and Polo-Redondo 1998).

E-business requires trusting supply chain partners with proprietary information. For firms to benefit fully from e-business there needs to be end-to-end free flows of data, which, currently, is not a defining feature of the South African apparel production-retail channel. Secondly, commercial information which most firms regard as being sensitive will need to be released for full benefits to be delivered. For this to happen close, collaborative relationships based on trust, loyalty and reciprocity will need to be cultivated first. This will not be an easy task considering the adversarial nature of the relations that traditionally exists between buyers and sellers.

A major challenge for the SA apparel industry is to expand markets geographically; and particularly to direct overseas market expansion. Our fieldwork evidence would seem to confirm that producers are not using the Internet to link into export markets. As noted in previous sections, we believe that SA garment-makers should target the higher value-added, more fashion-oriented segment of the export market which is characterised by shorter production runs, more complex styles and more frequent style changes. This segment is also quite demanding in terms of increased pressure on manufacturers to fill orders quickly, efficiently and flexibly. E-business capabilities will thus become essential for sustained competitiveness in the fashion-oriented segment of the value chain. The challenge for SA apparel manufacturers is to forge international linkages in order to establish a pipeline through which resources, technology, skills, etc. will flow from the lead firms in global-scale production networks. The Internet could play a pivotal role in building pipeline linkages with lead firms in the US and EU.

For the South African apparel industry, the benefits of e-business are likely to be more tangible in terms of *information management* rather than in procurement and sales. In other words, the real gains from online B2B e-commerce will come not from trading online but from better access to and the exchange of information such as supply and demand forecasts and reports of inventory levels along the supply chain. According to Berryman and Heck (2001: 20), “the unifying feature of collaboration on this model is the sharing of information over the Web”. At this early stage of e-business development, online digital trading networks are very much a long-term goal. Our findings indicate that sales, purchasing and operations are generally not Web-enabled. Therefore, transaction-processing benefits will be hard to achieve in the short-term.

What is it that the DTI can do which will have a genuine impact in the short- to medium-term? We believe that the DTI’s initiatives should be targeted in the short-term on promoting ICT-based communication and information exchange between firms, and on supply chain management and logistics (see Table 13). We believe that these are the two practical areas in which gains are likely to be more immediate. Our findings suggest that the lack of high-quality inter-firm information and data exchange produces various forms of supply chain inefficiencies in the industry. Therefore, effort and investment should be put in improving information flow in the apparel value chain. The policy challenges of such an intervention revolve around providing security, establishing a standard format for information flows and making sure that firms share information fairly.

Table 13: Policy Focus

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Potential productivity gains from B2B e-commerce:	Duration	Policy Priority
A seamless communication and information exchange channel	Short- to medium-term	High
Supply chain management and logistics	Short- to medium-term	High
Cost efficiencies from automation of transactions	Medium- to long-term	Medium
Possible economic advantages of new market intermediaries	Long-term	Low
Consolidation of demand and supply through organised B2B trade exchanges	Long-term	Low
Changes in the extent of vertical integration of firms	Long-term	Low

The DTI has a role to play in supporting and actively encouraging clothing manufacturers to adopt the Internet for managing information flows. State supply-side policy support programmes such as the Sector Partnership Fund, Competitiveness Fund and the Innovation Fund could be leveraged in this regard. There is also a role for other stakeholder groups such as SACTWU and Clofed to promote amongst their members an understanding of the strategic value of e-business. There may also be a role for the DTI, SACTWU and Clofed to work together on a project to plan and develop an information portal for the garments industry in South Africa. The information portal should aim to:

1. connect garment-makers and retailers through a common communication infrastructure of interactive tools; and
2. function as a gateway to individual corporate portals, where logistics and transaction management is handled by individual firms.

The industry portal will serve as a gateway to suppliers, producers and retailers in the textile-apparel production-retail channel. A profile of each firm would be provided, including information such as firm size, target market segments, product profile, its comparative advantages, etc. Furthermore there should be links to all DTI policy support programmes for the industry, market trends information, and trade enhancement packages like the SA-EU and AGOA trade agreements. The portal would also have links to the clothing Export Council, SACTWU, Clofed and other relevant institutions. All a company would need to connect to the information portal would be a PC which is linked to the Internet. Therefore even small companies with a rudimentary IT infrastructure will be able to link into the portal. The primary benefits of the information portal will be its ability to speed up the flow of information and to make it more widely available.

The hypothetical benefits of online B2B trade exchanges rest largely on the potential for seamlessly integrating data flows and work processes across the entire value chain. In the South African apparel industry this kind of deep integration would be very difficult to achieve, primarily because:

1. The supply chains are *complex* (as it involves both core products such as white dress shirts, lingerie, basic T

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shirts, etc. and specialised fashion items for which demand varies) and *fragmented* (because of trends such as outsourcing, subcontracting and informalisation of the industry); and

2. Many companies simply do not have Intranets, ERP and decision support systems, and are unlikely to make big investments in ICTs in the short-term to integrate their back- and front-office systems.

Real benefits of B2B trading exchanges have tended to be quite elusive. B2B e-marketplaces have simply not delivered the benefits that its supporters once promised (Agrawal and Pak 2001). Companies, such as low-end apparel retailers, purchasing commodity products might, however, value the liquidity, transparency and price-orientation of a B2B e-marketplace. This may also apply to producers purchasing commodity items such as buttons and zippers from input suppliers. On the other hand, companies purchasing highly specialised fashion garments value the possibilities for customisation offered by the traditional bilateral relationship between buyer and seller (Berryman and Heck 2001). Therefore, we believe that bilateral relationships will continue to be important in the fashion apparel industry. A hypothesis that emerges quite clearly from this study is that *online B2B e-commerce will be more advanced in commodity product markets, especially markets which are highly consolidated.*

The importance of the sensory factor in the garments industry means that it may not be feasible to trade *exclusively* in a virtual B2B marketplace by bypassing all forms of personal involvement and face-to-face communication with a network of suppliers and customers. Nonetheless, the Internet holds great potential for complementing and supplementing the dense web of personalised networks that have been built up in the apparel industry. Moreover, direct, personalised relationships may not necessarily be feasible for global trade considering the not inconsiderable barriers of time and distance. That notwithstanding, we believe that the major benefits of e-business for the garments industry are to be found in the realm of B2B supply chain management and logistics rather than in B2B e-marketplaces and online auction sites. Given the current state of the industry and the formidable obstacles facing e-business that need to be overcome, this is very much a long-term, and indeed, a continuing project. This does not detract from our main point, namely that the development of strategic, collaborative relations and an extended supply chain is important for an industry where “You are only as good as what you sold last season” (Manufacturer 6).

The new ICT technologies and logistics management systems offer the potential to improve internal efficiency and SCM through promoting more collaborative retailer-supplier relationships. Connected firms have better information available to them, enabling them to respond to competitive threats and opportunities more quickly than unconnected firms. Dynamic gains are likely to accrue from this strategic advantage. To maintain their competitive edge, retailers and manufacturers will need to expand into the emerging Internet-based B2B technologies. Virtually integrated supply chain management and logistics will not, however, in and of itself, guarantee prosperity and innovation in the South African apparel industry. But, it is fundamental to sustained competitive success.

Synchronized supply chains require highly visible information about all aspects of material sourcing, product manufacturing, packaging supplies, freight availability and customers needs. Virtually integrated SCM and logistics entails a shift from traditional adversarial relationships, where retailers squeeze suppliers on price or delivery times, to collaborative planning, forecasting and replenishment (CPFR) systems. For this to happen, though, manufacturers will need to have access, via the Internet, to the retailer’s database to check on promotional progress, branch sales or forecasts in demand, and plan manufacturing runs accordingly. This reduces unnecessary costs such as overtime production runs or wasted stocks. Manufacturers need to know when a retailer is out of stock, then they need to re-

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supply the retailer in a quick and cost-efficient manner. However, apparel manufacturers will only be able to respond positively to the new demands placed on them if the CMTs to which they subcontract, as well as their input suppliers are simultaneously hearing their markets, and adapting production accordingly. Allowing suppliers direct access to corporate databases and real-time EPOS transaction data will only take place when retailers realise that increased profits will only come from faster response to consumer demand.

At the moment e-commerce in the South African clothing sector is being driven by the aggressive marketing efforts of IT consultancies. The problem with this approach is that e-business is being seen as an IT solution rather than as a business strategy. With e-business the prime lever is not the technology itself, but people, intellectual capital and relationships. B2B e-commerce offers two major value-creating opportunities for apparel manufacturers: (1) the use of ICTs, particularly the Internet, to streamline, integrate and synchronise key *internal* (i.e. intra-organisational) operating processes (see Figure 3); and (2) extending these ICT-enabled processes to improve the efficiency and effectiveness of the supply chain (i.e. inter-enterprise linkages) (see Figure 4). B2B e-commerce is predicated on interoperability between the flexible IT infrastructures of firms that make up the supply chain. Since e-business is about integrating heterogeneous applications and databases across diverse platforms, it is a complex undertaking. The IT architectures of each firm cannot exist as disparate islands of e-commerce initiatives which are not tightly tied to supply chain management and logistics. If these were to happen then internal and collaboration functionality which is the essence of e-business, are likely to be thwarted.

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